CATÓLICA LISBON
BUSINESS & ECONOMICS

Do it yourself!
An analysis of the business opportunity of self-service technologies in the German retail industry

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Dissertation written under the supervision of Gonçalo Saraiva

Dissertation submitted in partial fulfillment of requirements for the MSc in International Management, at the Universidade Católica Portuguesa, 07th June 2019.

ABSTRACT

Title: Do it yourself! An analysis of the business opportunity of self-service technologies in the German retail industry

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The implementation of self-service technologies is transforming the German retail environment. Yet, not all retailers are able to evaluate the business value of these technologies. This study synthesizes prior research to develop a conceptual framework that assesses the business opportunity of self-service technologies through the relationship between consumers' technology readiness, their satisfaction with self-service technologies and the resulting behavioral intentions towards the respective retailers. The hypothesized framework was statistically significant supported, indicating that the technology readiness of consumers positively affects consumers' satisfaction with self-service technologies, which in turn affects consumers' behavioral intentions towards the respective retailers. Furthermore, it shows that technology readiness plays an important role of consumers' willingness to use an innovative self-service retail store. Further findings are presented to discuss the business opportunity of self-service technologies in the German retail industry. The study provides managerial implications and concludes with suggestions for future research.

Keywords: self-service technology; business opportunity assessment; technology readiness; consumer satisfaction; consumer behavioral intentions; German retail industry

SÚMARIO

Título: Faça Você Mesmo! Uma análise da oportunidade de negócios das tecnologias de autoatendimento no sector do retalho Alemão

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A implementação de tecnologias de autoatendimento está a transformar o sector do retalho Alemão. Contudo, nem todos os retalhistas conseguem avaliar o valor de negócio destas tecnologias. Este estudo sintetiza a investigação existente de modo a desenvolver um enquadramento conceptual que avalia a oportunidade de negócio inerente às tecnologias de autoatendimento através da relação entre a prontidão tecnológica dos consumidores, a sua satisfação com as referidas tecnologias e as intenções comportamentais resultantes para com os respetivos retalhistas. O enquadramento hipotético foi estatisticamente suportado de modo significativo, indicando que a referida prontidão afeta positivamente a satisfação dos consumidores com as tecnologias de autoatendimento o que, por sua vez, afeta as mencionadas intenções comportamentais. Além disso, a prontidão tecnológica assume um papel importante na intenção dos consumidores em recorrer a retalhistas inovadores com serviço de autoatendimento. Resultados adicionais são apresentados para discutir a oportunidade de negócio das tecnologias de autoatendimento na indústria do retalho Alemão. O presente estudo é concluído com sugestões para investigação futura e proporciona implicações ao nível de gestão.

Palavras-chave: tecnologia de autoatendimento; avaliação de oportunidades de negócio; prontidão tecnológica; satisfação dos consumidores; intenções comportamentais do consumidor; indústria de retalho alemã

ACKNOWLEDGEMENTS

First, I would like to thank my supervisor Gonçalo Saraiva, for guiding me throughout the entire process of my master thesis. Thank you for sharing your knowledge, challenging my ideas and encouraging me to adopt different perspectives. Your feedback was very valuable for the development of this thesis!

Furthermore, I would like to thank everyone who participated in my study. Thank you for taking the time and effort to support me with my data collection. Your contribution was essential!

Finally, I would like to highlight some special words to my family and friends. Thank your for always supporting me, standing behind me and my decisions and enabling me to successfully pursue the path I chose. It would not have been possible without you!

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GLOSSARY

ACSI	American Customer Satisfaction Index
ATM	Automated Teller Machine
EFA	Exploratory Factor Analysis
e.g.	Exempli Gratia (for example)
H	Hypothesis
SPSS	Statistical Package for the Social Sciences
SST	Self-Service Technology
TAM	Technology Adoption Model
TR	Technology Readiness
Vs.	Versus

1. INTRODUCTION

The development of new technologies is revolutionizing the retail industry with retailers using technology both internally and externally to improve efficiencies, enhance service operations and provide additional benefits for customers (Bitner, Zeithaml, & Gremler, 2010). From online shopping to supermarket self-checkouts, many retailers have begun to adopt new technologies to allow customers to consume and co-create services electronically without any interaction of firms' employees. These technological interfaces are called Self-Service Technologies (SSTs) (Meuter, Ostrom, Roundtree, & Bitner, 2000) and are expected to become a key driver for long-term business success in retailing (Lin & Hsieh, 2007). The wide range of SST alternatives available to retailers, such as web shops, chat bots and supermarket self-checkouts, can be utilized to improve service and gain competitive advantage. Accordingly, the role of technology in customer service has brought about major changes for both companies and customers (Lin & Hsieh, 2007).

The German retail industry seems to be a very promising industry to analyze the business opportunity of SSTs, given the sophisticated industry structure, its important role to the overall market economy and the high availability of SST options. Despite increasing importance and availability, there are only few studies on SST evaluation and very little is known about attitudinal, behavioral, and psychographic factors, which could influence consumer adoption of SSTs.

With most SST alternatives, consumers decide between an interpersonal and a technologically based encounter (e.g. to shop online vs. going to a physical retail store) (Meuter, Ostrom, Bitner, & Roundtree, 2003). As Meuter, Ostrom, Bitner and Roundtree (2003) stated, even when different choices are available, consumers will not use a SST option unless they feel comfortable with the technology and perceive a specific advantage for using it. There is also evidence of increased customer frustration when dealing with new technologies (Parasuraman, 2000). This indicates that consumers' adoption of technology will vary according to specific personal characteristics.

To assess the business opportunity of SSTs in the German retail industry, it is therefore incredibly important to understand how these characteristics influence consumers' experience with SSTs. When consumers face technology, different psychological reactions will occur, depending on the individual feelings towards the technology encounter (Lin & Hsieh, 2007). Parasuraman (2000) suggests that Technology Readiness (TR) is a characteristic that should be taken into consideration when the usage of SSTs is being analyzed, in order to predict the behavior of consumers more precisely.

In studies reported to date, there is very limited empirical research regarding the assessment of the business opportunity of SSTs and thus very little is known about factors influencing consumers' evaluation of SSTs and its consequent influence on business success (Dabholkar, 1996; Meuter, Ostrom, Roundtree, & Bitner, 2000), especially within the German retail industry.

Therefore, in order to address this research gap, this study seeks to examine the business opportunity of SSTs in the German retail industry by analyzing the relationship between consumers' TR, their satisfaction with SSTs and the resulting behavioral intentions towards retailers. With increased understanding of these issues, German retailers and service providers will be better prepared to offer SST options to customers and to manage the implementation of these technologies more effectively, which could lead to improved services and seamless customer journeys.

1.1 Problem statement

The scope of this study is to evaluate the business opportunity of SSTs in the German retail industry. Therefore, this study seeks to understand the relationship between consumers' TR, their satisfaction with SSTs and the resulting behavioral intentions towards retailers. To address this problem statement the following research questions will be examined:

RQ1: What are the current challenges in the German retail industry?

RQ2: How can these challenges be addressed by the adoption of SSTs?

RQ3: How frequently are SSTs used in the German retail industry and why do consumers use these alternatives?

RQ4: How does TR impact consumers' satisfaction with SSTs?

RQ5: How do consumers' satisfaction with SSTs impact consumers' behavioral intentions towards retailers?

1.2 Relevance

By answering these questions this study makes several contributions to the existing literature and industry knowledge. Namely, it clarifies if retailers can leverage SSTs in a way that addresses the current challenges of the German retail industry. Furthermore, it provides an initial step to evaluate the business opportunity of SSTs in the German retail industry by analyzing the relationship between consumers' TR, their satisfaction with SSTs and the resulting behavioral intentions towards the respective retailers. By doing so, this study provides a conceptual framework that takes into account both the consumers' perspective and the businesses' perspective for the SST evaluation in the German retail industry.

1.3 Research method

In order to answer the research questions, an exploratory research approach was used including both primary and secondary data. Secondary data of various academic journals and industry reports were collected and analyzed in order to provide the theoretical foundation for this study. Furthermore, primary data was gathered through an online survey to be able to empirically test the developed conceptual framework of this study.

1.4 Dissertation outline

The next chapter presents a literature review and describes the research context, which guides this study. The literature review compiles previous relevant studies and empirical evidence. First, the current research on the German retail industry is presented to identify current challenges within the industry. Following, the research on SSTs and their impact on businesses are examined. Further, the concept of TR and its influence on consumers' satisfaction with SSTs is studied. Finally, the case of Amazon Go is explored to provide a future outlook regarding self-service developments in the retail industry. The third chapter presents the methodology of this study, including the conceptual framework, data collection and research procedure for this study. Further, the measures applied as well as the sample is characterized. The fourth chapter contains the analysis of the collected data and demonstrates the results. Based on these results, the fifth chapter draws conclusions, managerial implications and points out the limitations of this research as well as indications for further research.

2. LITERATURE REVIEW

The following chapter presents a review of the existing literature regarding the study background and research questions. Previous studies, industry reports as well as empirical evidence from various academic journals, are studied and summarized.

2.1 The German retail industry and its current challenges

The German retail industry represents the third biggest economic sector within Germany (HDE, 2018). Currently there are around 300.000 retailers with around 410.000 stores making more than 513.3 billion euro a year, which represents 15.7% of the whole German GDP (Destatis, 2018). The five largest retailers in Germany include Edeka, Schwarz-Gruppe, Rewe, Aldi and Amazon.de with a combined turnover of 175.253 million euro (Veraart Reserach Group, 2017).

However, the German retail environment is currently characterized by high volatility and rapid directional change (Bearingpoint, 2015). The result is a strong need to understand critical retailing areas in which innovations are changing the game, so that German retailers can better understand where the retailing field will be evolving in the future. A comprehensive study from KPMG in cooperation with the scientific institute of German commerce EHI and the German trade association HDE (2016) has identified three key challenges for the German retail industry for 2025.

The first key challenge for retailers and their businesses is the demographic change. Hardly any industry is as affected by changes in the population and its structure as retailers' end-consumer business (Deloitte, 2018). Four demographic developments are of particular importance in Germany: Decline in population, aging population, small household growth and rising labor costs (KPMG, EHI, & HDE, 2016). Research found out that from todays' 81.8 million inhabitants, the number of Germans will fall to 80.5 million in 2025 and 71.9 million in 2050 (BiB, 2016). The decline in the German population is clouding the growth forecast for the retail industry in general. Although consumer spending has risen more strongly than in previous years as a result of rising real wages, the development of price-adjusted consumer spending does not promise long-term growth in the face of shrinking populations (Bearingpoint, 2015). Accordingly, researchers state that the retail sales can only increase if the share of total consumer spending rises again at the expense of other uses (KPMG, EHI, & HDE, 2016). However, this is unlikely in times of rising housing and energy costs, as well as increased spending on hedonic consumption such as vacation travel (KPMG, EHI, & HDE, 2016).

Furthermore, the decline in population forces retailers to shift their store locations. The German federal institute for population research (BiB) (2016) predicts that booming centers such as the city of Munich and the surrounding area are likely to grow by around 20% by 2035, while rural areas in

eastern Germany in particular may lose 20% to 30% of their population. This spatial concentration will continue to lead to intense competition in fast-growing markets and a continuing thinning out of the amount of retail offerings (KPMG, EHI, & HDE, 2016).

Besides that, the aging population in Germany plays an important role for managers and their future retail strategies. The proportion of 20- to 49-year-olds will fall from 38% in 2015 to 32% in 2050, while the group of over-80s is expected to grow from 6% to 14% (BiB, 2016). This means not only that retailers have to deal with changes on their target group structure but also that they have to develop new strategies to adapt to new consumer behaviors such as the one from the target group of best ager (KPMG, EHI, & HDE, 2016).

Further, the growth of small households represents a mayor factor of the demographic changes within Germany. The number of one- and two-person households will continue to increase in the future (BiB, 2016). However, the average household size has fallen from 2.11 to 1.99 persons in 2015 over the past decade and will continue to fall to an average of 1.91 persons per household by 2025 (BiB, 2016). In principle, smaller households are advantageous for retailers, since many purchases are not made per person, but per household and smaller packaging sizes promise higher margins (KPMG, EHI, & HDE, 2016). On the other hand, the number of households also increases the mix of the customer structure such as families, singles or pensioners, which in turn increases the amount of target groups. This development presents retailers with the challenge of satisfying an increasing number of different consumer needs (Grewal, Roggeveen, & Nordfältdt, 2017).

Moreover, the study of KPMG, EHI and HDE (2016) points out that the rising labor costs in Germany are a key challenge within the demographic changes. This is also supported through data from Statista. In 2018, there was an overall salary increase in Germany of 4.9% compared to the previous year (Statista, 2018). Furthermore, the salary trend in Germany has been almost consistently positive over the past 23 years (Statista, 2018).

The second main challenge for the German retail industry is the technological progress, which continues to be a game changer in retailing. Inman and Nikolova (2017) draw attention to how technologies currently influence businesses' profitability and are representing vital factors for future business success. With new technological possibilities the expectations and demands of the customers to the retailers increase (Inman & Nikolova, 2017). At the same time, consumers' usage patterns are changing, increasingly shaped by the flexible use of digital and mobile service offerings (KPMG, EHI, & HDE, 2016). As a result, customers switch between the various shopping channels and decide on their shopping experience much more self-determined than before (Piotrowicz & Cuthbertson, 2014). This means that consumers expect digital services even more frequently in the future. The study of KPMG, EHI and HDE (2016) indicates that an omnichannel strategy in

marketing and sales is taken for granted by almost all customers and thus will be indispensable for retailers in the future.

The third main challenges are disruptive business models. With regard to digitization, many retailers look at the big four tech companies also known as GAFA companies (Google, Amazon, Facebook and Apple) (Deloitte, 2018). In recent years, these have also strongly influenced the retail world with new business forms and business models and are experimenting with almost every new technology (Grewal, Roggeveen, & Nordfäldt, 2017). For example Amazon is pushing innovation through a new and disruptive store concept called Amazon Go. This new concept allows customers to scan their smartphone as they go into the store, pick up the products they want, and leave (Amazon, 2018). Deep learning technologies, Computer vision and sensor fusion automatically detect when products are taken from or returned to shelves and keep track of products in a virtual cart (Amazon, 2016). After consumers leave the store, they are charged and sent an automatic receipt via the App (Amazon, 2016). All that customers need is a smartphone, an Amazon account, and the Amazon Go app (Amazon 2016). These new self-service developments are revolutionizing the consumers' shopping experience and will set new expectations of what shopping can or should be in the future.

However, they also find it difficult to predict if and when a consumer accepts and adopts a technology (Grewal, Roggeveen, & Nordfäldt, 2017). Recent research by the EHI Retail Institute (2016) shows that the efficient linking of individual channels is a big challenge for German retailers. For two-thirds of retail companies in Germany, cross-channel process integration ranks first in the list of priorities (EHI Retail Institute, 2016). Already today, around 31% of the 1,000 leading retailers in Germany offer a click & collect service with branch-based payment (EHI Retail Institute, 2016). Around 23% of them are able to return goods ordered online in the store, and at 14%, customers can even view the store inventory online (EHI Retail Institute, 2016). As a result of these developments, the store experience of retailers will change considerably over the next few years.

Through the identification of these challenges in the German retail industry, it is important to discover whether one of these can be addressed through the adoption of SSTs. Therefore, in the following section, the research on SSTs and their impact on businesses will be examined and a connection to the respective challenges will be made.

2.2 The business opportunity of Self-Service Technologies

In the last two decades, researchers have begun to discover the role of technology in the delivery of services to assess the impact towards businesses (Mick & Fournier, 1998; Meuter, Ostrom, Roundtree, & Bitner, 2000; Parasuraman, 2000; Taillon & Huhmann, 2017). Technology is increasingly considered as an enabler of business competitive advantage in addition to its contribution to satisfy consumers' demand of innovative and high-quality products and services (Chen & Tsou, 2012; Inman & Nikolova, 2017; Pantano & Viassone, 2014). Because of the large deal of research on advanced technologies and the subsequent speed of development of new applications for supporting retailers and consumers (Pantano & Viassone, 2014), the retail industry is frequently subject to a disruptive innovation process that makes available a large amount of novel SSTs able to transform the traditional service encounter (Grewal, Roggeveen, & Nordfältdt, 2017).

SSTs are technological interfaces that enable consumers to use a service independent of direct service-employee involvement (Meuter, Ostrom, Roundtree, & Bitner, 2000). SSTs can be described either from a business perspective or from a user perspective through different classification criteria (Dabholkar & Bagozzi, 2002). The classification of SSTs used in this study is based on the typology of Meuter, Ostrom, Roundtree and Bitner (2000), which represents one of the few profound and empirically based SST classification schemes.

Figure 1 presents a conceptualization of present-day available SST options in the German retail industry, which is based on a review of current academic literature, industry reports and observations. The columns of Figure 1 represent the types of technologies retailers are using to interact with consumers in self-service encounters. The rows of Figure 1 represent the purposes of the technologies from the consumer perspective, thus what the consumer can accomplish by using these technologies.

Interface / *Purpose*	**Interactive Voice response**	**Online / Internet**	**Interactive Kiosks**	**Videos**
Customer Service	• Automated service hotlines	• Websites • Chat bots	• Digital service stations • Store tablets	
Transactions	• Automated order hotlines	• Web shops • Trading platforms • E-commerce marketplaces	• Self-checkout stations	
Self-Help	• Automated information hotlines	• Comparison portals • Websites • Chat bots	• Store tablets • Information screens	• Youtube

Figure 1: Categories and examples of present-day available SSTs in the German retail industry. Adapted from "Self-service technologies: understanding customer satisfaction with technology-based service encounters" by Meuter, Ostrom, Roundtree, & Bitner, 2000, *Journal of Marketing, 64 (3),* p. 52. Copyright 2000 by Sage Publications.

As consumers have become more comfortable using technology in the recent years, the demand for SSTs has risen tremendously (Grewal, Roggeveen & Nordfältdt, 2017; Shende, 2015). Prior research indicates that, SSTs offer several benefits for both companies and consumers (Beatson, Coote, & Rudd, 2006; Bitner, Zeithaml, & Gremler, 2010; Inman & Nikolova, 2017; Taillon & Huhmann, 2017).

From a business point of view, retailers have increasingly replaced employee-assisted services with SSTs to realize two main benefits, cost reduction and improved service (Bitner, Ostrom, & Meuter, 2002; Kimes & Collier, 2015; White, Breazeale, & Collier, 2012). Cost reduction derives from less traditional service employees and increasing productivity (Kokkinou & Cranage, 2015; Weijters, Rangarajan, Falk, & Schillewaert, 2007; Xue, Hitt, & Harker, 2007). For example, IBM shifted 99 million service telephone calls to an online service provision, which resulted in cost savings of two billion dollars (Burrows, 2001). Furthermore, SSTs improve the service delivery by processing transactions more efficiently and consistently, which allows retailers to adapt better to demand fluctuations and provides a more standardized service experience (Elliott, Hall, & Meng, 2013). Besides, research has shown that SSTs can enhance the customer acquisition and retention due to the convenient and flexible option to use multiple service channels (Ho & Ko, 2008; Inman & Nikolova, 2017; Reinders, Dabholker, & Frambach, 2008). Consequently, SSTs increase the

amount of customer touch points and allow retailers to expand their service offerings (Kokkinou & Cranage, 2015). According to Beatson, Coote & Rudd (2006) the use of SSTs in the service delivery also has a positive impact on customers' satisfaction and commitment, which thus can tie customers into closer relationships with retailers. Past research already showed that this influences the overall firm performance and is seen as primary objective for managers (Anderson, Fornell & Lehmann, 1994; Yi, 1990).

From a consumers' perspective, SSTs enable them to enjoy the services they require with a more flexible choice of time and space, which gives them a higher degree of satisfaction (Meuter, Ostrom, Roundtree, & Bitner, 2000; Van der Wal, Pampallis, & Bond, 2002). Moreover, studies have indicated that SSTs can have a positive impact on the perceived service quality (Kallweit, Spreer, & Toporowski, 2014; Lin & Hsieh, 2007; Makarem, Mudambi, & Podoshen, 2009). Furthermore, existing literature demonstrates that SSTs offer consumers additional benefits during a service encounter such as time saving, lower risk, easier to control, money saving and enjoyment (Dabholkar, 1996; Meuter, Ostrom, Roundtree, & Bitner, 2000; Walker, Craig-Lees, Hecker, & Francis, 2002).

However, expectations of SST encounters differ across consumers (Lee & Lyu, 2016), their level of familiarity with SSTs (Collier, Sherrell, Babakus, & Horky, 2014), types of SSTs (Dimitriadis & Kyrezis, 2011; Meuter, Ostrom, Roundtree, & Bitner, 2000; Robertson, McDonald, Leckie, & McQuilken, 2016) the amount of necessary employee interaction embedded within the service process and other situational factors (Collier, Moore, Horky, & Moore, 2015).

Thus, an adoption can also bring several disadvantages for both market participants. As a result of the substitution of service staff through SSTs, the consumer is forced to undertake the activity, which in turn means that the service loses its comfort (Gelbrich, 2009). In addition, consumers often have no support while using these technologies. As a consequence, they not only have to relinquish their personal communication with a service staff, but also have to get along with any errors that occur by themselves (Gelbrich, 2009). These difficulties especially appear in luxury retail settings (Kucukusta, Heung, & Hui, 2014). Luxury retailers enhance their service evaluations via personal service during traditional service encounters (Kucukusta, Heung, & Hui, 2014). SST applications that reduce the high involvement of personalized service encounters expected by luxury consumers would likely impair the shopping experience and customer relation (Kucukusta, Heung, & Hui, 2014). The current literature does not provide a specific method to assess the impact of SSTs towards business success. However, Taillon and Huhmann (2017) provide a first model that connects SST evaluation with customer-centric outcomes and financial success outcomes and thus represents an interesting approach for this study.

Based on the article from Taillon and Huhmann (2017), Figure 2 displays the strategic consequences of customers' post-use SST service evaluations on customers' behavioral intentions, such as loyalty, trust or positive word-of-mouth communication and the resulting financial success outcomes, such as profitability and enterprise value.

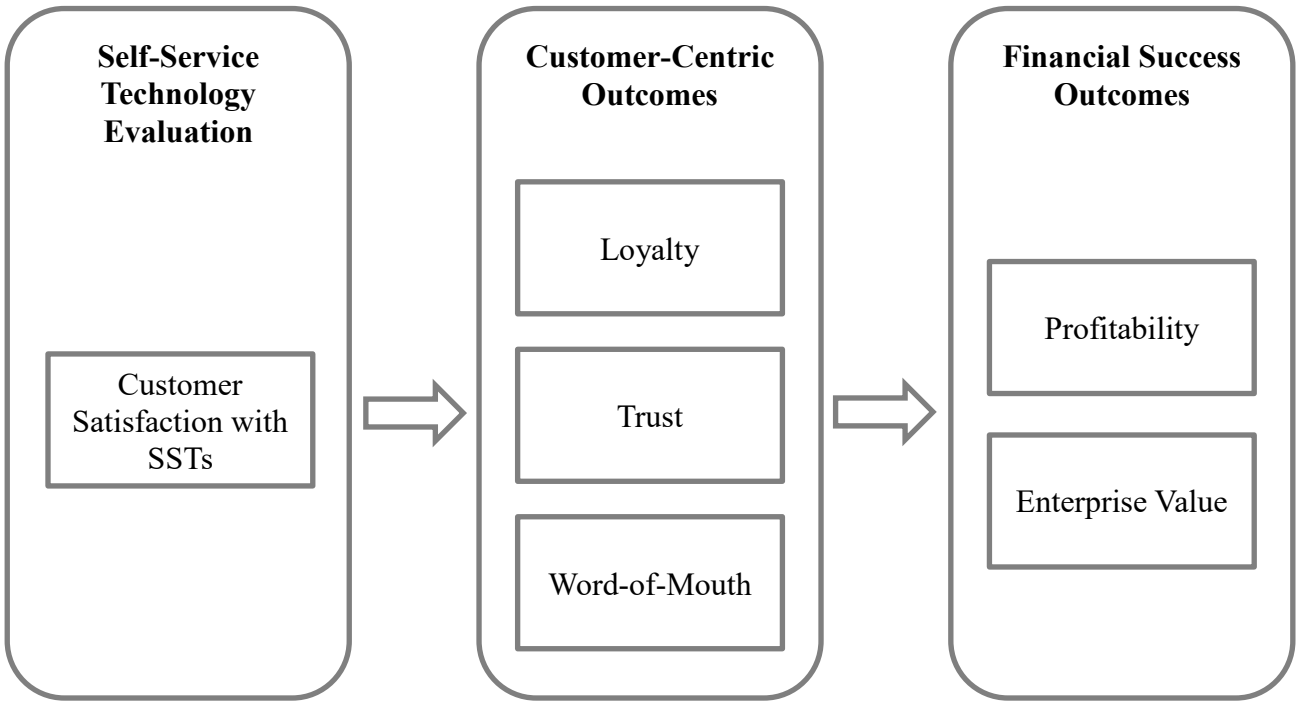


Figure 2: The Self-Service Technology evaluation model. Adapted from "Strategic consequences of self-service technology evaluations" by Taillon and Huhmann, 2017, *Journal of Strategic Marketing*, p. 2. Copyright 2017 Informa UK Limited, trading as Taylor & Francis Group.

Taillon and Huhmann (2017) see the evaluation of customer satisfaction with SSTs as the first analysis stage to assess the business value of SSTs. The model suggests that each positive or negative post-use SST evaluation should have a direct and additive impact on strategic consequences related to the costumer and an indirect impact on consequences related to financial success (Taillon & Huhmann, 2017). Although customer satisfaction with SSTs is only one of many other influences on customer-centric outcomes, their summed effects should impact consumers' behavioral intentions such as loyalty, trust and positive word-of-mouth communication (Taillon & Huhmann, 2017). Research has shown that these behavioral intentions have an impact on the financial success of a firm. The service management literature mostly agrees that customer satisfaction influences customer behavioral intentions, which in turn affects profitability (Anderson & Fornell, 1994; Heskett, Jones, Loveman, Sasser, & Schlesinger, 2008; Reichheld & Sasser, 1990; Rust, Zahorik, & Keiningham, 1995; Storbacka, Strandvik, & Grönroos, 1994). Prior research has

demonstrated that customer loyalty is a key driver of firms' long-term financial performance (Jones & Sasser, 1995). For example, dollars spent by loyal customers in a retail setting make a tremendous contribution to the overall profitability (Pepe, Abratt, & Dion, 2011). Even though the relation among customer-centric outcomes and profitability has not been researched SST related literature, profitability has been shown to increase after SST implementation (Taillon & Huhmann, 2017). For example, White, Breazeale and Collier (2012) found out that retailers adopt SSTs in order to increase profitability. This applies also to other industries. Since the 1990s, banks have increased profitability by encouraging customers to use SSTs, such as ATMs and online banking (Xue, Hitt, & Harker, 2007; Hung, Yen, & Ou, 2012).

Besides profitability, Taillon and Huhmann, (2017) propose the enterprise value as second factor to assess the financial success outcomes of SST adoption. This combination makes sense since profitability and enterprise value are known to share a similar positive correlation (Varaiya, Kerin, & Weeks, 1987). The enterprise value can be defined as the value of a firms' equity and debt minus its cash and non-operating assets and has often been used as an indicator of firm-centric outcome in financial research (Chen & Chen, 2011; Fama & French, 2006; Varaiya, Kerin, & Weeks, 1987; Yang, Lee, Gu, & Lee, 2010), but irregular in the marketing literature (Taillon & Huhmann, 2017). However, there are some marketing related studies that examine finance performance related to service evaluations through customer service. For example, prior research found out that customer satisfaction is associated with equity returns in a specific time period and higher satisfaction levels lead to higher excess returns over standard equity benchmarks, such as the Dow Jones Industrial Average or the Standard & Poor 500 (Fornell, Mithas, Morgeson III, & Krishnan, 2006).

Furthermore, higher customer satisfaction ratings tend to lower the risk in future cash flows, which in turn lowers equity returns and the cost of capital (Fornell, Mithas, Morgeson III, & Krishnan, 2006; Gruca & Rego, 2005). Anderson, Fornell and Mazvancheryl (2004) controlled for fixed, random, and unobservable factors and found a strong relation between customer satisfaction and the key performance indicator Tobins' q, which is commonly calculated as the market value of a firms' equity and liabilities divided by its book value. Besides, some American Customer Satisfaction Index (ACSI) studies show a positive correlation between consumer satisfaction and stock market returns (Fornell, Mithas, Morgeson III, & Krishnan, 2006). Summarizing, positive SST evaluation should benefit customer-centric outcomes, such as loyalty, trust or positive word-of-mouth communication, which should ultimately improve firm-centric outcomes, such as profitability and enterprise value.

Considering the findings of section 2.1 combined with the respective benefits of SSTs for companies and consumers, it is evident that certain challenges within the German retail industry can

be addressed through the implementation of SSTs. For example, the technological progress and the increased demand for digital and mobile services of customers can be addressed through the introduction of SST options such as online shops or digital information kiosks (Grewal, Roggeveen, & Nordfäldt, 2017). Further, research has shown that companies who are using SSTs are increasing their customer touch points and service alternatives, which has a positive impact on the customer involvement and satisfaction (Beatson, Coote, & Rudd, 2006). This was also validated through reserach of Makarem, Mudambi, & Podoshen (2009) who have additionally identified that nowadays, antecedents of customer satisfaction with service encounters involve both technology and human interaction. Following this, the introduction of SSTs into the service delivery not only can solve the increased expectations of customers but also represents a new opportunity to stay competitive in times of technological progress.

Further, the challenge of disruptive business models can be tackled through SST options (Piotrowicz & Cuthbertson, 2014). Although the introduction of SSTs alone would not help to build an innovative business model, it is nevertheless a first step in the direction of an omnichannel service strategy, which is highly demanded by German customers (KPMG, EHI, & HDE, 2016). Amazon Go is a good example of approaching the challenge of disruptive business models through SSTs and could set new standards for the retail industry (Grewal, Roggeveen, & Nordfäldt, 2017).

Existing research has shown that the implementation of SSTs can also approach the demographic challenge of rising labor costs by replacing service employees through technology (Bitner, Zeithaml, & Gremler, 2010; Dabholkar, 1996; Inman & Nikolova, 2017). For Example IBM reports that chat bots can help reduce customer service costs by 30% through freeing up service agents for more challenging work (Reddy, 2017). Even if the possible financial benefits of successful technology adoption are enticing, retailers cannot profit from the savings unless customers embrace and use these new technologies. For example, McKinsey reported that one company projected 40 million dollar savings because of changing its billing and service calls to the Web (Meuter, Bitner, Ostrom, & Brown, 2005). Nevertheless, this company had a 16 million dollar loss, partially as a result of lower customer use than was projected (Meuter, Bitner, Ostrom, & Brown, 2005).

In conclusion, before benefits can arise for consumers and businesses, it is imperative that consumers not only accept these SSTs, but also adopt them. Parasuraman (2000) suggests that TR should be taken into consideration to analyze and predict consumer behavior with new technology encounters. In order to give a complete and empirically relevant analysis of the business opportunity of SSTs in the German retail industry it will be examined how technology ready German consumers are and if this influences their satisfaction with SSTs and their future behavioral

intentions towards retailers. Therefore the next section explains what TR is and how it can be used in this study.

2.3 Technology Readiness and the influence on consumers' satisfaction with SSTs

Prior research has shown that consumers often adopt SSTs, but also commonly abandon these new technologies (Meuter, Bitner, Ostrom, & Brown, 2005; Meuter, Ostrom, Bitner, & Roundtree, 2003; Parasuraman, 2000; Yen, 2005; Zeithaml, Parasuraman, & Malhotra, 2002). The use of SSTs varies based to on different personality traits such as TR (Lin & Hsieh, 2007). Thus, retailers who are deploying SSTs into their service processes need to understand their customers' readiness to use such technologies (Lin & Hsieh, 2007).

The term TR refers to peoples' tendency to accept and use new technologies to accomplish tasks in their free time or at work (Parasuraman, 2000). Related research on TR and technology adoption, as well as human-technology interactions, include the technology acceptance model (TAM), technology paradoxes as well as computer anxiety and technology anxiety (Lin & Hsieh, 2007). The TAM was developed by Davis, Bagozzi, & Warshaw (1989) and reflects general aspects of potential drivers and inhibitors of technology acceptance. With regards to technology paradoxes, Mick and Fournier (1998) conducted extensive qualitative research on peoples' reactions towards technology and discovered eight technology paradoxes with which consumers have to deal: assimilation/isolation, competence/incompetence, control/chaos, efficiency/inefficiency, freedom/enslavement, new/obsolete, fulfills/creates needs and engaging/disengaging. As these paradoxes infer, technology can cause both positive and negative feelings in an individual (Lin & Hsieh, 2007). Prior research has shown that forms of anxiety may include computer anxiety – the fear that people have when considering potential or actual utilization of computers (Igbaria & Parasuraman, 1989; Kay, 1993) and technology anxiety – users' negative attitude about technology applications (Meuter, Ostrom, Bitner, & Roundtree, 2003). Other relative studies have also identified specific consumer beliefs and motivations that may enhance (e.g. perceived ease of use, fun) or inhibit (e.g. perceived risk) the adoption of new technologies (Davis, Bagozzi, & Warshaw, 1989; Dabholkar, 1994).

The TR concept can be seen as an overall mental condition created through different enablers and inhibitors that together determine a persons' attitude towards technologies (Parasuraman, 2000). Parasuraman (2000) developed a 36-item scale based on four dimensions namely optimism, innovativeness, discomfort and insecurity. The first two dimensions, namely optimism and innovativeness, are positive drivers of TR, which encourage customers to use technology and to build a positive attitude towards technology, whereas the other two dimensions, namely discomfort

and insecurity, are negative drivers, making customers averse to use technology (Parasuraman, 2000). The research of Parasuraman and Colby (2007) discovered that customer segments with different TR profiles vary significantly in terms of online behaviors, while Yen (2005) found out that not every person is equally ready to use technology-based services.

As a consequence, the construct of TR cannot be ignored in evaluating customers' adoption of SSTs because it plays an important role in the resulting perceptions and behaviors towards the SST provider and thus represents a vital factor for a complete analysis of the business opportunity of SSTs in the German retail industry. So far, very little academic research has been done on the impact of TR on consumers' satisfaction with SSTs, especially within the German retail industry.

Satisfaction with a service provider is perceived as being both an evaluation- and emotion-based response to a service encounter (Oliver, 1997). Besides, it is also described as an evaluation of an emotion, suggesting that it reflects the degree to which a consumer thinks that the possession or use of a service creates positive feelings (Cronin, Brady, & Hult, 2000; Rust & Oliver, 1994). Prior research of Lin and Hsieh (2007) suggests that TR indeed has a positive influence on consumers' satisfaction with SSTs and call for further research in different countries and contexts to validate their findings.

To extend the current literature on TR and SST evaluation the innovative self-service concept of Amazon Go will be included in this study as a proxy for future self-service developments. Following this, the next section presents the concept of Amazon Go and describes how it works at the present time.

2.4 The innovative self-service concept of Amazon Go

As already briefly mentioned in section 2.1, Amazon is introducing an innovative self-service store concept, which is considered to be a game changer within the retail industry (Grewal, Roggeveen, & Nordfäldt, 2017). Since this concept is so new and does not exist in Germany it represents a very good opportunity to assess the future willingness to use such self-service concepts within the German retail industry and could give interesting insights and food for thoughts to enhance the development of SST applications.

Amazon Go is an innovative concept for convenience stores in the United States, operated by the online retailer Amazon and can be viewed as the next development stage of retailers' SST adoption (Amazon, 2018). To date there are ten Amazon Go stores, four in Seattle, four in Chicago and two in San Francisco (Amazon, 2018). The convenience stores are partly automated, with customers able to shop products without being checked out by a cashier or using a self-checkout station (Wingfield, 2016; Garun, 2016). The first Amazon Go store, located in the companys' Day 1

building, opened to employees on December 5th, 2016 and to the public on January 22nd, 2018 (Amazon, 2018). Amazons' flagship store offers prepared foods, meal kits, limited groceries, and beverages available for purchase (Day, 2018). According to a promotional video published by Amazon (2016), the store concept deploys several technologies, along with computer vision, deep learning algorithms, as well as sensor fusion to automate much of the purchase, checkout, and payment processes associated with a retail transaction. The concept of Amazon Go is seen as a revolutionary model that relies on the availability of smartphones and geo-fencing technology to improve the customer experience, as well as supply chain and inventory management (Grewal, Roggeveen, & Nordfältdt, 2017). Customers must download the Amazon Go app on their smartphones, which is linked to their Amazon account, before shopping at the store (Bosa, 2018). With the app users can also add other people to their Amazon account, so purchases of relatives or friends can be charged to the same bill (Valdes & Pisani, 2018). Within the store there are multiple cameras installed and store shelves have weight sensors, to assess which items a customer took (Reuters, 2018). If a customer takes an item off the shelf, it will be added to the persons' virtual cart and in case the customer places an item back on the shelf, it is also removed from the customers' virtual cart (Amazon, 2016). Some visual impressions of Amazon Go can be found in Appendix III.

3. METHODOLOGY

The following chapter explains the conceptual framework and the hypotheses, which guide this study. Furthermore, the research approach that was used to explore the research questions and to reach conclusions about the hypotheses is presented. Finally, all measures are explained as well as the sample of this study is described.

3.1 Conceptual Framework

This study seeks to understand the relationship between consumers' TR, their satisfaction with SSTs and the resulting behavioral intentions towards the respective retailers. In addition to the main relationship construct, the relation between TR and the willingness to use an innovative self-service store is included in the conceptual framework. Following this, Figure 3 illustrates the conceptual framework with the corresponding hypotheses of this study.

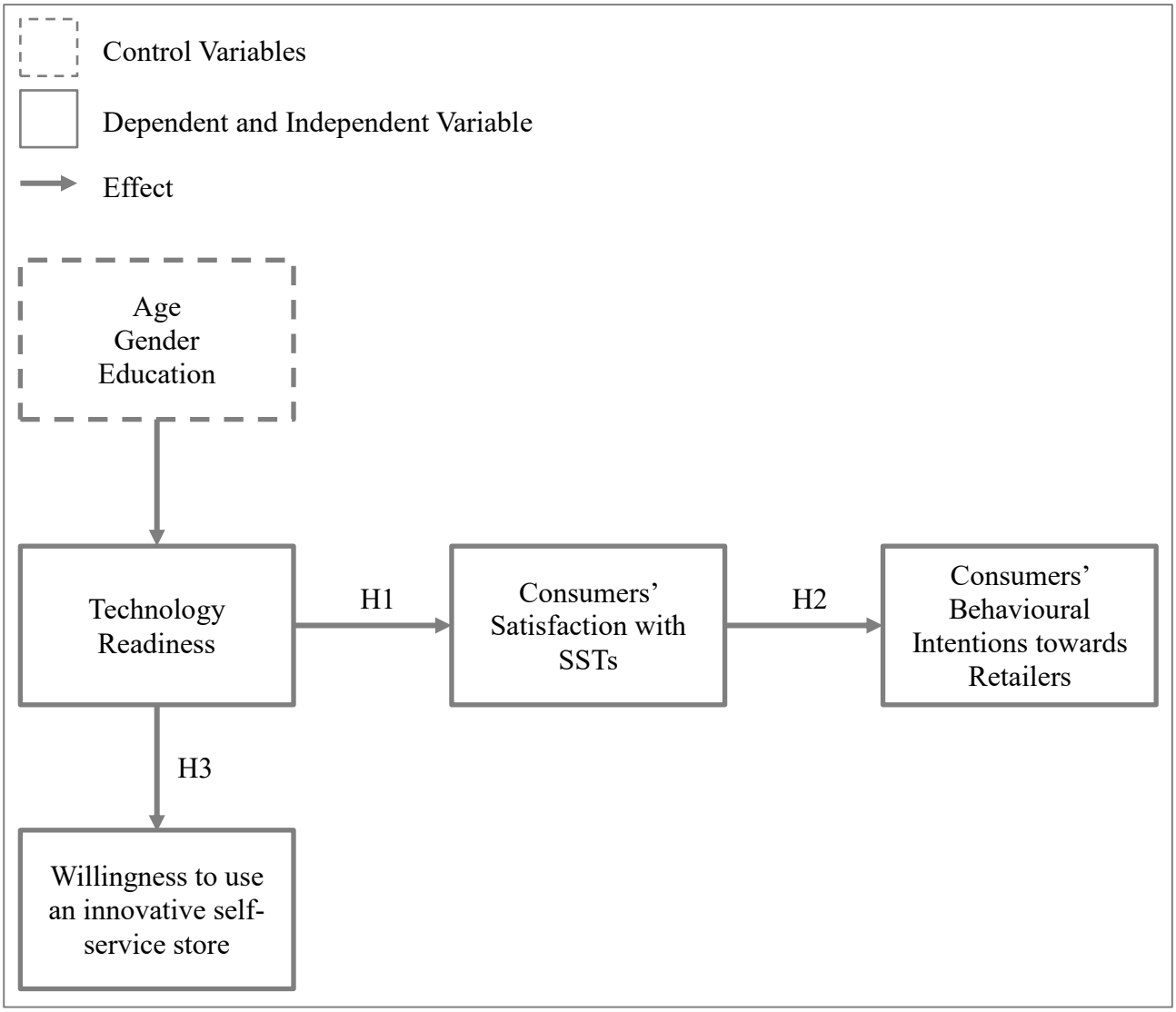


Figure 3: Conceptual Framework

For the conceptual framework it is presumed that TR influences consumers' satisfaction with SSTs. Meuter, Ostrom, Bitner and Roundtree (2003) suggest that technology anxiety is related to consumers' satisfaction with SSTs. Moreover, prior research indicates that consumers' satisfaction with technology encounters vary due to different personal characteristics (Parasuraman, 2000). Lin and Hsieh (2007) already found a statistically significant support for the influence of TR on consumers' satisfaction with SSTs in Taiwan. However, they call for more empirical research in different contexts and countries to further validate their findings. Therefore, it is hypothesized that TR positively influences consumers' satisfaction with SSTs.

H1: TR has a positive influence on consumers' satisfaction with SSTs

Furthermore, it is presumed that consumers' satisfaction with SSTs positively influences consumers' behavioral intentions towards the respective retailers. Evidence for the impact of satisfaction on behavioral intentions comes from a wide variety of marketing research, which points out that customer satisfaction has a positive impact on loyalty, trust, and positive word-of-mouth communication (Cronin, Brady, & Hult, 2000; Rust & Williams, 1994). For example, a satisfied customer is less likely to search for information on alternatives and resists more attempts by competitors to develop a closer relationship compared to an unsatisfied customer (Anderson & Srinivasan, 2003). Similar results were also found in studies with regards to SSTs (Lin & Hsieh, 2007). The research of MacDonald and Smith (2004) showed a significant correlation among satisfaction with communication mediated through technology and future behavioral intentions. In addition, Taylor and Hunter (2002) stated that customer satisfaction is a key driver for customer loyalty in an e-CRM environment. Furthermore, studies of Anderson and Srinivasan (2003), Yang and Peterson (2004) and Yen and Gwinner (2003) showed that e-satisfaction has a positive impact on e-loyalty. Based on these findings, it is hypothesized that consumers' satisfaction with SSTs has a positive influence on consumers' behavioral intentions towards the respective retailer.

H2: Consumers' satisfaction with SSTs has a positive influence on consumers' behavioral intentions towards the respective retailer

Besides the main relationship construct between TR, consumers' satisfaction with SSTs and consumers' behavioral intentions towards retailers, the relationship between TR and the willingness to use an innovative self-service retail store such as Amazon Go is included, in order to take potential future self-service developments in the German retail industry into account. In this respect,

it is presumed that TR has a positive influence on consumers' future willingness to use innovative self-service stores. Parasuraman (2000) suggest that people with higher TR are more eager to use technology-based services. Since this self-service retail concept relies heavily on the use of technology it is presumed that Germans who have a higher TR have a higher willingness to use such an innovative self-service concept.

H3: TR has a positive influence on consumers' willingness to use innovative self-service stores such as Amazon Go

In addition to these relationships, variables exist that are expected to influence consumers' TR that must be controlled for. Thus, the conceptual framework includes the control variables age, gender and education, which are known to influence consumers' TR (Meuter, Ostrom, Bitner, & Roundtree, 2003).

Based on the findings of the literature review, this framework seems to be a valid approach to assess the business opportunity of SSTs, because it takes both direct customer-centric factors and indirect financial success factors into consideration. The following section presents the data collection and research procedure, which were used to empirically test the conceptual framework.

3.2 Data collection and research procedure

Based on the research aim and the developed conceptual framework, an online survey was designed in Qualtrics and available in English. The complete survey guide can be found in Appendix I. The questionnaire was pretested two times to ensure that the developed questions were understood as intended and go hand in hand with the survey approach. An online survey was selected because of several advantages in terms of time, reach and cost-efficiency. Further, online surveys allow participants to decide anonymously and voluntarily whether, when, where and how they will respond to the questionnaire, which has a positive impact on the level of honesty of the responses. The online survey was distributed and shared via e-mail and social media. All participants participated voluntarily in the study.

After a small introduction, including relevant information regarding the terms of the research study, a screening question was asked to ensure that participants were living in Germany. After this screening question, participants were asked if they used a SST in a retail context in the last three months or not. Thereafter, the research study proceeded to assess consumers' satisfaction with SSTs. Participants judged their latest SST experience and indicated their level of satisfaction with the SST encounter. They were also asked about their future behavioral intentions towards the

respective retailer, specifically about their loyalty, trust and word-of-mouth recommendation intentions. Further, participants answered the adopted TR measure. Then, an innovative self-service store concept similar to the one of Amazon Go was presented. After being informed about this new self-service store concept, participants indicated their willingness to use it and described their expected benefits of using such a self-service store. Further, participants were asked whether they are familiar with Amazon Go or not. Finally, demographics, including gender, age, education and current occupation, were collected. The survey ended with a debriefing statement, including a message of acknowledgment. The entire procedure took approximately seven minutes.

3.3 Measures

Scales from prior research provided measurement sources for the present study. To increase the predictive validity most variables were measured using multi-item scales. However, based on previous studies and due to the complexity of this study, some constructs were measured with single items only.

3.3.1 Consumers' satisfaction with SSTs

For the measurement of consumers' satisfaction with SSTs, participants were asked if their last SST encounter was a satisfying or dissatisfying experience. Furthermore, the three-item ACSI scale was used to assess consumers' satisfaction with SSTs. The three items were "Overall, I am satisfied with the SST encounter", "The SST encounter exceed my expectations" and "The SST encounter was close to my ideal service encounter". The items were assed on a seven-point Likert scale. The ACSI was already used and discussed in a number of studies including Anderson, Fornell and Mazvancheryl (2004), Kristensen, Westlund and Eskildsen (2003) and Lin and Hsieh (2007). According to Fornell, Johnson, Anderson, Jaesung and Bryant (1996) the ACSI was developed through a specific method for measuring customer satisfaction with a broad range of consumer goods and services. Thus, it represents a comprehensive evaluation of a firms' service offerings, which means that it is an accurate indicator of a firms' past, current, and possibly future performance (Fornell, Johnson, Anderson, Jaesung, & Bryant, 1996).

3.3.2 Current SST Usage in the German retail industry

The online survey also assessed the current usage of a wide range of present-day available SSTs in the German retail industry. The eleven SST options used in this study were websites, online shops, self-checkout stations, information kiosks, chat bots, automated hotlines, support sites, package tracking services, click & collect stations, e-commerce marketplaces and comparison portals. The

usage rates were measured by a four-point Likert scale already used by Meuter, Ostrom, Bitner and Roundtree (2003) ranging from “I have never used” to “I use regularly”.

3.3.3 Reasons for using SST options in a German retail context

To assess the reasons for using a SST option in a German retail context, respondents were provided with a list of eleven benefits commonly associated with using SSTs. The benefits were identified through prior research of (Beatson, Coote, & Rudd, 2006; Dabholkar, 1996; Meuter, Ostrom, Roundtree, & Bitner, 2000; Walker, Craig-Lees, Hecker, & Francis, 2002; Yen, 2005). They included easy to use, saves time, when I want, where I want, saves money, easy to control, enjoyable, convenient, low risk and better than the alternative. Respondents were asked to rate each of the benefits on a seven-point Likert scale developed by Meuter, Ostrom, Bitner and Roundtree (2003) with endpoints “very unimportant factor in my decision” to “very important factor in my decision”.

3.3.4 Consumers’ behavioral intentions towards retailers

For the measurement of consumers’ behavioral intentions towards the respective retailers, a three-item scale adapted from Mols (1998) and Gefen, Karahanna and Straub (2003) was used. The measure includes the three items: “I say positive things about the company to other people”, “I would encourage friends and relatives to use the company” and “I intend to do more business with the respective company”. The three items were assessed on a seven-point Likert scale with endpoints “strongly disagree” to “strongly agree” and aimed to evaluate the behavioral intentions loyalty, word-of-mouth communication and trust.

3.3.5 Technology Readiness

Regarding the measurement of consumers’ TR, an adopted version of the 36-item scale of the technology readiness index (TRI) developed by Parasuraman (2000) was used. The TRI combines all the research that is related to consumers’ TR and has a very good reliability and validity. To avoid respondent fatigue, not all 36 TR items proposed by Parasuraman (2000) were included. Instead, a reduced set of 12 items was chosen and modified to reflect more the research purpose and study background. Each of the four TR dimensions had three items. The 12 items were assessed on a seven-point Likert scale with endpoints “strongly disagree” and “strongly agree”.

3.3.6 Consumers' willingness to use an innovative self-service store such as Amazon Go

To be able to give some future outlooks and estimations on how the German retail experience could change and if German consumers are willing to adapt to these changes, participants were provided with a description of an innovative self-service store concept, similar to the one of Amazon Go. For the measurement of consumers' willingness to use such a self-service store, participants were asked how likely they would use such a retail store. The single item was assessed on a seven-point Likert scale with endpoints "very unlikely" and "very likely".

3.3.7 Consumers' expected benefits of an innovative self-service store such as Amazon Go

Further, the online survey assessed the expected benefits of using a self-service store such as Amazon Go. For the qualitative measurement, participants were asked an open question regarding their expected benefits. This measure should give some interesting insights about the success criteria of such an innovative self-service store concept.

3.3.8 Consumers' awareness of Amazon Go

To measure consumers' awareness of Amazon Go, respondents were asked a closed question if they are familiar with Amazon Go or not. This measure was used to get some insights about consumers' knowledge about the innovative self-service concept of Amazon Go.

3.4 Participants

In total, 244 participants participated in the research study. However, 84 questionnaires had to be deleted since they were either not finished or the filter check indicated that they were not living in Germany at the time of the study. Therefore, a total of 160 valid responses were analyzed. The sample consists of 52,8% women and 47,2% men. Regarding the age, participants range from 20 to 61 years. The average age of the sample is 30 years. More than half of the sample (57,4%) is employed, whereas 37,6% of the sample are students. 0,6% of the participants are retired and 4,3% fall under the category Other. In terms of the level of education, 39,9% have a Bachelor degree, 36,8% a Master degree, 19,6% have a High-school Diploma, 1,8% a Phd and another 1,8% fall under the category None.

4. RESULTS

This chapter describes the analysis methods that were used to investigate the business opportunity of SSTs in the German retail industry. First, the data preparation is described. Then the results of the SST analysis are presented. Finally the results from the hypotheses testing are demonstrated. All analyses were conducted in the Statistical Package for the Social Sciences (SPSS). The respective SPSS outputs of the SST analysis and the hypothesis testing can be found in the Appendix II.

4.1 Data preparation

An exploratory factor analysis (EFA) was run to explore the interrelationships among the sets of variables, which should be used in the conceptual framework. The EFA confirmed that the proposed set of four variables is suitable for the test of the conceptual framework. Thus, since most these variables were measured using multi-item scales, new variables were computed using the means. Furthermore, the scales' reliability was tested using Cronbach's alpha. The alpha values for the constructs and subscales are above the desirable minimum of .80, and hence surpass the acceptable level of .70 recommended by Nunnally (1978). The measurements used in this study, therefore, indicate high internal consistency. For all analyses within this study, a significance level of 5% was taken into consideration.

4.2 Results from the SST analysis in the German retail industry

From the total sample of 160 valid participants, 135 (84,4%) have used a SST in a retail context during the last three months and 25 (15,6%) have not. Out of the 135 participants who used a SST in a retail context 115 (85,2%) reported a satisfying SST experience and only 20 (14,8%) an unsatisfying SST experience.

Regarding the usage rates of available SSTs in the German retail industry, the comparison of means revealed that websites are the most frequently used SST option (mean 3,54), followed by online shops (mean 3,51), package tracking services (mean 3,04), self-checkout stations (mean 2,91), comparison portals (mean 2,82), e-commerce marketplaces (mean 2,72), support sites (mean 2,35), automated hotlines (mean 2,01), information kiosks (mean 1,95), chat bots (mean 1,88) and click & collect stations (mean 1,81). Although this sample may have a generally higher level of SST usage, it is important to note the differences in usage rates across the different SST options. It is evident from the results that websites, online shops and package tracking services are regularly used by a large percent of respondents, whereas information kiosks, chat bots and click & collect stations are used infrequently. Self-checkout stations, comparison portals, e-commerce marketplaces, support sites and automated hotlines have a mixed usage pattern.

With the diverse usage rates across SSTs in the German retail industry, it is helpful to find out why the participants use SSTs. Understanding the benefits of using SSTs in a retail context may provide some insights to explain why some SSTs are used more frequently than others. From the ten benefits commonly associated with SSTs, a principle component analysis was run in order to determine the core reasons and underlying benefits of using SST options in a retail context. The Kaiser- Meyer-Olkin (KMO) value was .837, exceeding the recommended value of .600 by Kaiser (1974) and Bartlett's Test of Sphericity reached statistical significance of .000, supporting the factorability of the correlation matrix according to Bartlett (1954).

The Principal components analysis revealed the presence of two components with eigenvalues exceeding 1, explaining 47,5% and 12,9% of the variance respectively. However, it was decided to retain three components for further investigation. The three-component solution explained a total of 70,2% of the variance, with component one contributing 47,6%, component two contributing 12,9% and component three contributing 9,8%. The dominant benefit appears to be that SSTs provide customers a more convenient service alternative. This group of benefits includes characteristics such as easy to use, saves time, where I want and when I want. The second key benefit corresponds to the intrinsic benefit of enjoyment whereas the third key benefit indicates that, SSTs are perceived to save money in a retail context.

Furthermore, it was examined to what extend German consumers are willing to use new and innovative self-service retail stores. Therefore, the new store concept of Amazon Go was used as a proxy for future self-service store developments. The overall sample is likely to use such an innovative self-service store with a mean of 4,9 out of 7. It can be said that men have a slightly higher willingness to use these self-service stores (mean 5,1) compared to women (mean 4,7).

Furthermore, participants indicated their expected benefits of such a self-service store. Therefore, a content analysis was conducted to see which benefits were stated the most. The most stated benefits of German consumers are time efficiency, convenience, cheaper prices and digital receipts. This finding goes hand in hand with the ones of the principle component analysis, which confirms the importance of perceived benefits such as convenience, enjoyment and money-saving.

Regarding the familiarity of Amazon Go, it can be said that the sample was not that familiar with Amazon Go. 43,8% indicated that they are familiar with Amazon Go whereas 56,2% stated that they are not familiar with Amazon Go. Furthermore, it was analyzed whether people who are familiar with Amazon Go have a higher willingness to use an innovative self-service store. The comparison of means revealed that people who are familiar with Amazon Go indeed have a higher willingness to use an innovative self-service store with a mean of 5,8 out of 7 compared to people who are not familiar with Amazon Go (mean 4,2).

4.3 Results from the hypotheses testing

The first hypothesis of this study pertains to the influence of TR on consumers' satisfaction with SSTs. Evaluations on consumers TR are expected to have a positive impact on consumers' satisfaction with SSTs. A multiple regression analysis was performed with TR (TR_Overall) as the predicting variable and consumers' satisfaction with SSTs (SST_SAT) as the dependent variable, controlling age, gender and education. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. A significant regression equation was found ($F(4,130) = 4.155$ $p < .003$), with R Square of .113.

Hence Hypothesis 1 is confirmed. TR has a positive influence on consumers' satisfaction with SSTs. The control variables gender ($p = .108$), age ($p = .840$) and education ($p = .955$) showed no significant influence for the relationship between TR and consumers' satisfaction with SSTs.

The second hypothesis of this study relates to the relationship between consumers' satisfaction with SSTs and their resulting behavioral intentions towards the respective retailers. To determine whether consumers' satisfaction with SSTs influences consumers' behavioral intentions towards the respective retailers, linear regression analyses was performed with consumers' satisfaction with SSTs (SST_SAT) as the independent variable and consumers' behavioral intentions towards retailers (BI_Retailers) as the dependent variable. Again, preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. A significant regression equation was found ($F(1,133) = 37.575$, $p < .000$), with R Square of .220. Consequently, Hypothesis 2 is confirmed. Consumers' satisfaction with SSTs positively influences consumers' behavioral intentions towards the respective retailers.

The third hypothesis of this study refers to the influence of TR on consumers' willingness to use an innovative self-service retail store such as Amazon Go. In order to test, if TR influences consumers' willingness to use such innovative self-service store, another linear regression analysis was conducted with TR (TR_Overall) as the predicting variable and consumers' willingness to use an innovative self-service stores as the dependent variable. Once more, preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. A significant regression equation was found ($F(1,158) = 46.386$, $p < .000$), with R Square of .227. As a result Hypothesis 3 is confirmed. TR positively influences consumers' willingness to use an innovative retail store.

5. CONCLUSIONS AND LIMITATIONS

This study aimed to assess the business opportunity of SSTs in the German retail industry. Therefore, it was evaluated whether or not retailers can address certain challenges in the German retail industry through the adoption of SSTs. Furthermore, in order to give a complete and empirically valid analysis of the business opportunity of SSTs in the German retail industry, both the perspective of consumers and the perspective of businesses were examined. Following this, it was analyzed if TR influences consumers' satisfaction with SSTs. Further, to assess the potential business success of retailers it was researched if consumers' satisfaction with SSTs influences consumers' behavioral intentions towards the respective retailers. The following chapter summarizes the main findings of this study and draws conclusions. Finally, managerial implications will be identified, followed by the limitations of this study and suggestions for further research.

5.1 Main findings and business opportunity discussion

Due to the recent rapid growth of SSTs, retailers are prompted to gain a further understanding of the business value of SSTs. However, until now there has been a lack of empirical research and application regarding the evaluation of the business opportunity of these technologies.

This study reviews relevant literature to discuss the business opportunity of SSTs in the German retail industry. The necessary conceptual framework and hypotheses are developed and empirically tested in order to offer retailers a reference when evaluating or introducing SSTs and planning the subsequent marketing strategies. The empirical results significantly support the conceptual framework proposed in this study. Testing the conceptual framework identified three key results.

First, the results show that TR is an important driver of SST satisfaction. There is a positive relationship between TR and consumers' satisfaction with SSTs. That is to say, the higher a customers' TR is, the higher their satisfaction will be when using SSTs. Against the suggestion of Meuter, Ostrom, Bitner and Roundtree (2003) this study indicates that demographic characteristics such as age, gender and education do not significantly influence the relation between TR and consumers' satisfaction with SSTs. One reason that could explain this result is, that the sample of this study is well educated with high SST usage rates and thus could be characterized as technology affine.

Second, consumers' satisfaction with SSTs has a significant positive influence on their future behavioral intentions towards the respective retailers. This means, the higher consumers' satisfaction with SSTs is, the more likely it is that they stay loyal, trust the retailer or conduct positive word-of-mouth recommendations.

Lastly, this study confirms that TR positively influences consumers' willingness to use an innovative self-service store. Hence, the higher consumers' TR is, the more likely it is that they would try new and innovative self-service concepts such as Amazon Go. This result confirms the findings of the literature review and shows that consumers' TR plays an important role in consumers' adoption process of new technologies.

Besides the main findings of the conceptual framework, this study shows that most of the participants are satisfied with the current SSTs available in the German retail market. However, there are wide variances in usage rates across these SSTs. It is particularly interesting that out of the ten provided SSTs; the three most used SSTs in the German retail industry are internet-based. Furthermore, three key benefits were identified through principle component analysis, which may help to understand these varying usage rates. In particular, SSTs should facilitate convenience, enjoyment and the opportunity to save money in a German retail context. It is presumed that as SST options are perceived to incorporate more of these identified key benefits, they will be used by an increasing number of consumers.

In addition, it was examined to what extend German consumers are willing to use new and innovative self-service stores, such as the ones of Amazon Go. The results have shown that the overall sample is likely to use such self-service stores, which indicates that the self-service developments of Amazon Go in the United States of America may also work out in Germany. However, retailers, who are thinking to introduce such self-service stores, should pay increased attention to the expected benefits identified in this study. Time saving, convenience, cheaper prices and digital receipts are perceived benefits, which can give retailers a first indication for their future store concept developments.

In summery, the results of this study show that there is a business opportunity of SSTs in the German retail industry. The literature review reveals that retailers can leverage SSTs in a way that addresses the current challenges of the German retail industry. The origin of the business value of SSTs can be derived from two main factors: cost reduction and capability building. With regards to cost reduction, SSTs enable retailers to reduce their labor costs by replacing service employees through technology. In addition, retailers can save costs and increase efficiency through customer co-creation. Besides the opportunity to cut costs, SSTs provide access to additional capabilities with which retailers can address the current challenges of demographic changes, technological progress and business model innovations, such as enhancing customer touch points or building new self-service business models.

However, before these benefits arise and retailers can profit from this business opportunity, customers have to adopt these new technologies. This study has shown that TR plays an important

role for the satisfaction with SSTs and thus should be taken into consideration while developing and introducing SSTs. Where the field of self-service goes will depend on new emerging forces such as the Internet of things, virtual or augmented reality, artificial intelligence and robots. It will be very interesting how these new technologies will influence SST applications and if they create new use cases for retailers.

5.2 Managerial Implications

The expansion of SSTs throughout the retail industry has been an important development for retailers. The current study supports German managers and marketers in their strategic decision-making by helping them better to understand and predict the outcomes of SST adoption in times of disruptive technology innovations. A number of implications for retailers can be derived from the study results.

Firstly, the results of this study show that retailers who offer SSTs or consider implementing SSTs should give the TR of their customers an increased attention. For example, retailers who are offering SSTs should promote better attitudes about technology and increase their customer knowledge through different kind of marketing activities or service guidance. Retailers have to define realistic goals in accordance with their costumers' TR, in order to not get too far ahead of them and to support them in overcoming obstacles or difficulties when using SSTs. With this in mind, an increased level of customer education will consequently result in an increased customer satisfaction with SSTs.

Secondly, customers should be consulted and involved in the development and implementation process of SSTs to ensure that SSTs address customer needs so that customers will be able to accept these self-service developments even faster.

Thirdly, retailers should ensure that SSTs embrace a convenient and enjoyable SST experience while offering the opportunity to save time and money. Success with SSTs starts with a reinforcing cycle of increased acceptance, positive service experiences, belief in benefits and improved willingness to try new self-service options. This could be reached, among other things, through simple and user-friendly SST interfaces. In order to identify further positive drivers, managers could use methods such as the Kano model developed by Noriaki Kano in 1984, with which they could identify and classify specific quality attributes according to customer preferences (Shahin, Pourhamidi, Antony, & Hyun Park, 2013). In times of increased individualization of products and services, an understanding of customers' personalized preferences would help in offering customized features for SSTs. As a consequence, retailers are able to offer value-based SSTs, which in turn affect costumers' satisfaction with SSTs and behavioral intentions towards retailers.

Fourthly, retailers should reduce geographic and time limitations through internet-based SSTs, giving costumers an increased choice as to place and time of the contact.

Finally, although SSTs can be a valuable tool for retailers and their customers, it is important to provide more choices, as not all customers have a high TR or willingness to use SSTs. Besides encouraging customers to use SSTs, retailers still need to provide service delivery options for customers with lower TR or unwillingness to use innovative self-service applications so that they will be still able to interact with the retailer according to their preferences.

In conclusion it can be said that managers should be aware of the current challenges within their industry. In times of rapid directional changes and technological progress it becomes even more important to be informed about changing consumer behavior. Managers and marketers should increase their knowledge about their customers in order to provide a suitable and seamless customer journey. In summery, the possibilities to reduce waiting time, reduce labor costs or to build new capabilities that address current challenges make SSTs a very promising investment within the German retail industry.

5.3 Limitations and future research

While this study was successful at analyzing the business opportunity of SSTs in the German retail industry through the relationship between TR, consumers' satisfaction with SST and the resulting behavioral intentions towards the retailers, it is important to acknowledge some possible limitations that must be kept in mind when considering the results of this study and that may provide suggestions for further research.

Firstly, future research might expand beyond the single context of the current research to multiple contexts. This study focuses on the German retail industry and thus takes only SSTs into account, which are used in this specific industry. It might be important to include other industries and countries with different kind of SSTs to further validate and enlarge the findings of this study.

Secondly, the valid sample used in this study is a rather small sample, and thus cannot be considered as very representative. For further analyses, the study could, therefore, be repeated with a more representative sample and a broader number of respondents.

Thirdly, further research should focus on enhancing the proposed framework with additional constructs such as profitability and enterprise value. Therefore, firm data could be used to quantify and capture the real financial success of the respective retailers. Based on existing literature such future analyses of the conceptual framework and its hypotheses should reflect a strong connection between positive SST service evaluations and strategically important consequences.

Fourthly, this study does not take any situational factors into account while assessing consumers' satisfaction with SSTs. Thus, further research should also explore the possible impact of situational factors such as waiting time, time pressures or the presence of other people that may have an impact on the model. While this study focused on the influence of TR on consumers' satisfaction of SSTs, there might be other attitudinal, behavioral, and psychographic factors that could influence consumers' satisfaction with SSTs.

Fifthly, it could be interesting to evaluate each of the current SSTs available in the German market on the importance of benefits commonly associated with SSTs. This would give retailers a first impression on what features they should focus on when improving or thinking about implementing a specific SST.

Finally, with retailing technology applications available through multiple on- and offline channels, effective utilization and management of these SSTs will become increasingly critical in the years ahead. The evolving use cases of SSTs present both new opportunities for retailers and new directions for academic research. This study represents an initial step in exploring the business opportunity of SSTs in the German retail industry by analyzing the impact of consumers' TR on their satisfaction with SSTs and their resulting behavioral intentions towards the respective retailers. Detailed investigation of the areas discussed above will further help retailers striving to incorporate technology into their service operations for better performance and it is hoped that the technology progress will further stimulate additional research in this important area.

REFERENCE LIST

Alexandris, K., Dimitriadis, N., & Dimitra, M. (2002). Can perceptions of service quality predict behavioral intentions? An exploratory study in the hotel sector in Greece. *Managing Service Quality: An International Journal , 12* (4), pp. 224-231.

Amazon. (2018). *Amazon Go*. Retrieved 03 11, 2019, from https://www.amazon.com/b?ie=UTF8&node=16008589011

Amazon. (2016). *Introducing Amazon Go and the world's most advanced shopping technology.* Retrieved from Youtube: https://www.youtube.com/watch?v=NrmMk1Myrxc

Anderson, E., Fornell , C., & Lehmann, D. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. *Journal of marketing , 58* (3), pp. 53-66.

Anderson, E., Fornell, C., & Mazvancheryl, S. (2004). Customer satisfaction and shareholder value. *Journal of marketing , 68* (4), pp. 172-185.

Anderson, R., & Srinivasan, S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology & marketing , 20* (2), pp. 123-138.

Bartlett, M. (1954). A note on the multiplying factors for various chi square approx- imations. *Journal of the Royal Statistical Society , 16* (B), pp. 296-298.

Bearingpoint. (2015). Strukturwandel im deutschen Einzelhandel - Warum gerade Klein- und Mittelstädte von den Folgend des Strukturwandels im Einzelhandel besonders betroffen sind. *Red Paper - Retail & Consumer , 8*(1). Germany.

Beatson, A., Coote, L. V., & Rudd, J. (2006). Determining consumer satisfaction and commitment through self-service technology and personal service usage. *Journal of Marketing Management , 22* (7-8), pp. 853-882.

Bhatnagar, N., Lurie, N., & Zeithaml, V. (2003). Reasoning about online and offline service experiences: the role of domain-specificity in the formation of service expectations. *Advances in Consumer Research , 30*, pp. 383-384.

BiB. (2016, 07 22). *Federal Institute for Population Research.* Retrieved 03 11, 2019, from Bevölkerungsentwicklung 2016. Daten, Fakten, Trends zum demografischen Wandel: https://www.bib.bund.de/Publikation/2016/pdf/Bevoelkerungsentwicklung-2016-Daten-Fakten-Trends-zum-demografischen-Wandel.html

Bitner, M., Ostrom, A., & Meuter, M. (2002). Implementing successful self-service technologies. *Academy of management perspectives , 16* (4), pp. 96-108.

Bitner, M., Zeithaml, V., & Gremler, D. (2010). Technology's impact on the gaps model of service quality. In *Handbook of service science* (pp. 197-218). Bosten: Springer.

Bosa, D. (2018, 01 21). *CNBC*. Retrieved 2019, from Amazon's automated grocery store will launch Monday after a year of false starts: https://www.cnbc.com/2018/01/21/amazon-go-automated-grocery-store-is-poised-to-launch.html

Burrows, P. (2001, June 18). "The Era of Efficiency". *Business Week* , 94-98.

Chen, J.-S., & Tsou, H.-T. (2012). Performance effects of IT capability, service process innovation, and the mediating role of customer service. *Journal of Engineering and Technology Management , 29* (1), pp. 71-94.

Chen, L., & Chen, S. (2011). The influence of profitability on firm value with capital structure as the mediator and firm size and industry as moderators. *Investment Management and Financial Innovations , 8* (3), pp. 121-129.

Collier, J., Moore, R., Horky, A., & Moore, M. (2015). Why the little things matter: Exploring situational influences on customers' self-service technology decisions. pp. 703-710.

Collier, J., Sherrell, D., Babakus, E., & Horky, A. B. (2014). Understanding the differences of public and private self-service technology. *Journal of Services Marketing , 28* (1), pp. 60-70.

Cronin, J. J., Brady, M. K., & Hult, G. T. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of retailing , 76* (2), pp. 193-218.

Dabholkar, P. A. (1994). Technology-based service delivery: a classification scheme for developing marketing strategies. *Advances in services marketing and management , 3* (1), pp. 241-271.

Dabholkar, P. (1996). Consumer evaluations of new technology-based self-service options: an investigation of alternative models of service quality. *International Journal of research in Marketing , 13* (1), pp. 29-51.

Dabholkar, P., & Bagozzi, R. (2002). An attitudinal model of technology-based self-service: moderating effects of consumer traits and situational factors. *Journal of the academy of marketing science , 30* (3), pp. 184-201.

Dabholker, P. (2000). Technology in service delivery: Implications for self-service and service support. In D. Iacobucci , & T. Swartz, *Handbook of services marketing and management* (pp. 103-110). Calefornia, USA: Thousand Oaks.

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science , 35* (8), pp. 982-1003.

Day, M. (2018, 01 21). *Amazon Go cashierless convenience store opens to the public in Seattle*. (T. S. Times, Editor) Retrieved 02 24, 2019, from https://www.seattletimes.com/business/amazon/amazon-go-cashierless-convenience-store-opening-to-the-public/

Deloitte. (2018). *Global Powers of Retailing 2018.* Retrieved 02 20, 2019, from https://www2.deloitte.com/content/dam/Deloitte/at/Documents/about-deloitte/global-powers-of-retailing-2018.pdf

Destatis. (2018). *Federal Statistical Office of Germany (Destatis).* Retrieved 02 24, 2019, from https://www.destatis.de/DE/ZahlenFakten/Wirtschaftsbereiche/BinnenhandelGastgewerbeTourismus/GrossEinzelhandel/GrossEinzelhandel.html

Dimitriadis, S., & Kyrezis, N. (2011). The effect of trust, channel technology, and transaction type on the adoption of self-service bank channels. *The Service Industries Journal , 31* (8), pp. 1293-1310.

EHI Retail Institute. (2016). *Omnichannel- Commerce 2016.* Retrieved 02 24, 2019, from https://www.ehi-shop.de/image/data/PDF_Leseproben/Omnichannel_2016_Leseprobe.pdf

Elliott, K. M., Hall, M. C., & Meng, J. (2013). Consumers' intention to use self-scanning technology: The role of technology readiness and perceptions toward self-service technology. *Academy of Marketing Studies Journal , 17* (1), pp. 129-143.

Fama, E., & French, K. (2006). Profitability, investment and average returns. *Journal of Financial Economics , 82* (3), pp. 491-518.

Fornell, C., Johnson, M., Anderson, E., Jaesung, C., & Bryant, B. (1996). The American customer satisfaction index: nature, purpose, and findings. *Journal of marketing , 60* (4), pp. 7-18.

Fornell, C., Mithas, S., Morgeson III, F., & Krishnan, M. (2006). Customer satisfaction and stock prices: High returns, low risk. *Journal of marketing , 70* (1), pp. 3-14.

Garun, N. (2016, 12 05). *Amazon just launched a cashier-free convenience store*. (T. Verge, Editor) Retrieved 02 23, 2019, from No lines, no registers, no self-checkout machines: https://www.theverge.com/2016/12/5/13842592/amazon-go-new-cashier-less-convenience-store

Gefen, D., Karahanna, E., & Straub, D. (2003). Trust and TAM in online shopping: an integrated model. *MIS quarterly , 27* (1), pp. 51-90.

Gelbrich, K. (2009). Beyond just being dissatisfied: How angry and helpless customers react to failures when using self-service technologies. *Schmalenbach Business Review , 61* (1), pp. 40-59.

Grewal, D., Roggeveen, A., & Nordfäldt, J. (2017). The future of retailing. *Journal of Retailing , 93* (1), pp. 1-6.

Gruca, T., & Rego, L. (2005). Customer satisfaction, cash flow, and shareholder value. *Journal of marketing , 69* (3), pp. 115-130.

HDE. (2018). *HDE Handelsverband Deutschland.* Retrieved 03 05, 2019, from https://einzelhandel.de/images/presse/Graphiken/DerEinzelhandel.pdf

Heskett, J. L., Jones, T. O., Loveman, G. W., Sasser, W. E., & Schlesinger, L. A. (2008). Putting the service-profit chain to work. *Harvard business review* , pp. 118-129.

Ho, S.-H., & Ko, Y.-Y. (2008). Effects of self-service technology on customer value and customer readiness: The case of Internet banking. *Internet research , 18* (4), pp. 427-446.

Hung, C. S., Yen, D. C., & Ou, C. S. (2012). An empirical study of the relationship between a self-service technology investment and firm financial performance. *Journal of Engineering and Technology Management , 29* (1), pp. 62-70.

Igbaria, M., & Parasuraman, S. (1989). A path analytic study of individual characteristics, computer anxiety and attitudes toward microcomputers. *Journal of Management , 15* (3), pp. 373-388.

Inman, J., & Nikolova, H. (2017). Shopper-facing retail technology: a retailer adoption decision framework incorporating shopper attitudes and privacy concerns. *Journal of Retailing , 93* (1), pp. 7-28.

Jones, T., & Sasser, W. (1995). Why satisfied customers defect. *Harvard Business Review , 73* (6), pp. 88-91.

Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika, , 39*, pp. 31-6.

Kallweit, K., Spreer, P., & Toporowski, W. (2014). Why do customers use self-service information technologies in retail? The mediating effect of perceived service quality . *Journal of Retailing and Consumer Services , 21* (3), pp. 268-276.

Kay, R. (1993). An exploration of theoretical and practical foundations for assessing attitudes toward computers: The computer attitude measure (CAM). *Computers in human behavior , 9* (4), pp. 371-386.

Kimes, S., & Collier, J. (2015). How customers view self-service technologies. *MIT Sloan Management Review , 57* (1), p. 25.

Kokkinou, A., & Cranage, D. (2015). Why wait? Impact of waiting lines on self-service technology use. *International Journal of Contemporary Hospitality Management , 27* (6), pp. 1181-1197.

KPMG, EHI, & HDE. (2016). *Trends im Handel 2025. Erfolgreich in Zeiten von Omni-Business.* Retrieved 03 01, 2019, from http://einzelhandel.de/images/presse/Studie_Trends_Handel_2025.pdf

Kristensen, K., Westlund, A., & Eskildsen, J. (2003). The predictive power of intangibles. *Measuring Business Excellence , 7* (2), pp. 49-55.

Kucukusta, D., Heung, V., & Hui, S. (2014). Deploying self-service technology in luxury hotel brands: Perceptions of business travelers. *ournal of Travel & Tourism Marketing , 31* (1), pp. 55-70.

Lee, H.-J., & Lyu, J. (2016). Personal values as determinants of intentions to use self-service technology in retailing. *Computers in Human Behavior , 60*, pp. 322-332.

Lin, J.-S., & Hsieh, P.-L. (2007). The influence of technology readiness on satisfaction and behavioral intentions toward self-service technologies. *Computers in Human Behavior , 23* (3), pp. 1597-1615.

MacDonald, J., & Smith, K. (2004). The effects of technology-mediated communication on industrial buyer behavior. *Industrial marketing management* , pp. 107-116.

Makarem, S., Mudambi, S., & Podoshen, J. (2009). Satisfaction in technology-enabled service encounters. *Journal of Service Marketing , 23* (3), pp. 134-144.

Meuter, M. L., Ostrom, A. L., Bitner, M. J., & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Reserach , 56* (11), pp. 899-906.

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: understanding customer satisfaction with technology-based service encounters. *Journal of Marketing , 64* (3), pp. 50-65.

Meuter, M., Bitner, M., Ostrom, A., & Brown, S. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of marketing , 69* (2), pp. 61-83.

Mick, D., & Fournier, S. (1998). Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. *Journal of Consumer research , 25* (2), pp. 123-143.

Mols, N. (1998). The behavioral consequences of PC banking. *International Journal of bank marketing , 16* (5), pp. 195-201.

Nunnally, J. (1978). *Psychometric theory.* New York: McGraw-Hill.

Oliver, R. (1997). *Satisfaction: A behavioral perspective on the consumer* . New York: McGraw-Hill.

Pantano , E., & Viassone, M. (2014). Demand pull and technology push perspective in technology-based innovations for the points of sale: The retailers evaluation. *Journal of Retailing and Consumer Services , 21* (2), pp. 43-47.

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research , 2* (4), pp. 307-320.

Parasuraman, A., & Colby, C. (2007). *Techno-ready marketing: How and why your customers adopt technology.* New York, USA: The Free Press.

Pepe, M., Abratt, R., & Dion, P. (2011). The impact of private label brands on customer loyalty and product category profitability. *Journal of product & Brand management , 20* (1), pp. 27-36.

Piotrowicz, W., & Cuthbertson, R. (2014). Introduction to the special issue information technology in retail: Toward omnichannel retailing. *International Journal of Electronic Commerce , 18* (4), pp. 5-16.

Reddy, T. (2017, 10 17). *IBM*. Retrieved 03 20, 2019, from How chatbots can help reduce customer service costs by 30%: https://www.ibm.com/blogs/watson/2017/10/how-chatbots-reduce-customer-service-costs-by-30-percent/

Reichheld, F., & Sasser, W. (1990). Zero defeofions: Quoliiy comes to services. *Harvard Business Review , 68* (5), pp. 105-111.

Reinders, M., Dabholker, P., & Frambach, R. (2008). Consequences of forcing consumers to use technology-based self-service. *Journal of Service Research , 11* (2), pp. 107-123.

Reuters, T. (2018, 01 22). *Amazon's 1st high-tech grocery store opens to the public*. (CBC, Editor) Retrieved 03 14, 2019, from https://www.cbc.ca/news/technology/amazon-go-grocery-store-1.4497862

Robertson, N., McDonald, H., Leckie, C., & McQuilken, L. (2016). Examining customer evaluations across different self-service technologies. *Journal of services marketing , 30* (1), pp. 88-102.

Rust, R., & Oliver , R. (1994). *Service quality: Insights and managerial implications from the frontier. Service quality: New directions in theory and practice.* CA: Thousand Oaks.

Rust, R., & Williams, D. (1994). How length of patronage affects the impact of customer satisfaction on repurchase intention. *Journal of Consumer Satisfaction, Dissatisfaction, and Complaining Behavior , 7*, pp. 107-13.

Rust, R., Zahorik, A., & Keiningham, T. (1995). Return on quality (ROQ): Making service quality financially accountable. *Journal of marketing , 59* (2), pp. 58-70.

Shahin, A., Pourhamidi, M., Antony, J., & Hyun Park, S. (2013). Typology of Kano models: a critical review of literature and proposition of a revised model. *International Journal of Quality & Reliability Management , 30* (3), pp. 341-358.

Shende, S. (2015, 05). *World self services technologies market.* (A. M. Reserach, Ed.) Retrieved 04 03, 2019, from Opportunities and forecasts, 2014-2020 : https://www.alliedmarketresearch.com/self-services-technologies-market

Statista. (2018). *The Statistcs Portal*. Retrieved 03 02, 2019, from Gehalts- und Lohnentwicklung in Deutschland gegenüber dem Vorjahr von 1992 bis 2018: https://de.statista.com/statistik/daten/studie/75731/umfrage/entwicklung-der-bruttoloehne-in-deutschland/

Statista. (2013). *The Statistics Portal*. Retrieved 03 03, 2019, from Durchschnittliche jährliche Personalkosten je Beschäftigten im Einzelhandel in Europa nach Ländern im Jahr 2013 (in 1.000 Euro): https://de.statista.com/statistik/daten/studie/261452/umfrage/personalkosten-im-einzelhandel-in-europa-nach-laendern/

Storbacka, K., Strandvik, T., & Grönroos, C. (1994). Managing customer relationships for profit: the dynamics of relationship quality. *International journal of service industry management , 5* (5), pp. 21-38.

Taillon, B., & Huhmann, B. (2017, 12 06). Strategic consequences of self-service technology evaluations. *Journal of Strategic Marketing , 27* (3), pp. 1-12.

Taylor, S., & Hunter, G. (2002). The impact of loyalty with e-CRM software and e-services. *International Journal of Service Industry Management , 13* (5), pp. 452-474.

Valdes , M., & Pisani, J. (2018, 01 23). *Get your stuff and go: Amazon opens store with no cashiers*. (T. A. Press, Editor) Retrieved 03 14, 2019, from https://apnews.com/b242616659954f08966b1e68cd479444

Van der Wal, R., Pampallis, A., & Bond, C. (2002). Service quality in a cellular telecommunications company: a South African experience. *Managing Service Quality , 12* (5), pp. 323-335.

Varaiya, N., Kerin, R., & Weeks, D. (1987). The relationship between growth, profitability, and firm value. *Strategic Management Journal , 8* (5), pp. 487-497.

Veraart Reserach Group. (2017). *Retail Index: all major retailers in Europe*. Retrieved 02 21, 2019, from https://www.retail-index.com/Countries/ToprankingretailersinGermany.aspx

Walker, R., Craig-Lees, M., Hecker, R., & Francis, H. (2002). Technology-enabled service delivery: An investigation of reasons affecting customer adoption and rejection. *International Journal of service Industry management , 13* (1), pp. 91-106.

Weijters, B., Rangarajan, D., Falk, T., & Schillewaert, N. (2007). Determinants and outcomes of customers' use of self-service technology in a retail setting. *ournal of Service Research , 10* (1), pp. 3-21.

White, A., Breazeale, M., & Collier, J. (2012). The effects of perceived fairness on customer responses to retailer SST push policies. *Journal of Retailing , 88* (2), pp. 250-261.

Wingfield, N. (2016, 12 05). *Amazon Moves to Cut Checkout Line, Promoting a Grab-and-Go Experience*. (N. Y. Times, Editor) Retrieved 02 23, 2019, from https://www.nytimes.com/2016/12/05/technology/amazon-moves-to-cut-checkout-line-promoting-a-grab-and-go-experience.html

Xue, M., Hitt, L., & Harker, P. T. (2007). Customer efficiency, channel usage, and firm performance in retail banking. *Manufacturing & Service Operations Management , 9* (4), pp. 535-558.

Yang, C.-C., Lee, C.-f., Gu, Y.-X., & Lee, Y.-W. (2010). Co-determination of capital structure and stock returns—A LISREL approach: An empirical test of Taiwan stock markets. *The Quarterly Review of Economics and Finance , 50* (2), pp. 222-233.

Yang, Z., & Peterson, R. (2004). Customer perceived value, satisfaction, and loyalty: The role of switching costs. (W. O. Library, Ed.) *Psychology & Marketing , 21* (10), pp. 799-822.

Yen, H. (2005). An attribute-based model of quality satisfaction for internet self-service technology. *The Service Industries Journal , 25* (5), pp. 641-659.

Yen, H., & Gwinner, K. (2003). Internet retail customer loyalty: the mediating role of relational benefits. *International Journal of Service Industry Management , 14* (5), pp. 483-500.

Yi, Y. (1990). *Review of marketing* (Vol. 1). Chicago: American Marketing Association.

Zeithaml , V., Berry, L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of marketing , 60* (2), pp. 31-46.

Zeithaml, V., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the academy of marketing science , 30* (4), pp. 362-375.

APPENDICES

Appendix I: Online Survey

Block 1: Introduction and Screening Question

Intro. Thank you for taking the time to participate in this survey. I'm a Master student at Católica Lisbon School of Business and Economics. The following survey is part of my final Dissertation.

Completing this survey will take approximately 7 minutes.

I appreciate your honest answers. Please read the provided questions carefully and answer according to your opinion. There are no right or wrong answers and all the information will be kept confidential. The information will be collected anonymously and used exclusively within the scope of this dissertation respecting the privacy of the respondents.

Thank you very much for participating and collaborating in this study!

Best regards,
Moritz Heinemann

Q1. Are you currently living in Germany?

- Yes
- No

→

Block 2: Self-Service Technology Evaluation

Q2. This survey is about Self-Service Technologies (SSTs) in the German retail industry. SSTs are technological interfaces that enable you to use a service independent of direct service-employee involvement. Examples of SSTs in the retail industry include online shops, chat bots, self checkout stations and more.

Have you used a self-service technology in a retail context during the last three months?

Yes

No

→

Q3. Was this self-service technology encounter a satisfying or dissatisfying experience?

Satisfying

Dissatisfying

Q4. On a scale of 1 (strongly disagree) to 7 (strongly agree), please rate the following statements according to your self-service technology experience:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
Overall, I am satisfied with the SST encounter	O	O	O	O	O	O	O
The SST encounter exceed my expectations	O	O	O	O	O	O	O
The SST encounter was close to my ideal service encounter	O	O	O	O	O	O	O

Q5. On a scale of 1 (strongly disagree) to 7 (strongly agree), please rate the following statements regarding the company where you used the self-service technology:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
I say positive things about the company to other people	O	O	O	O	O	O	O
I would encourage friends and relatives to use the company	O	O	O	O	O	O	O
I intend to do more business with the respective company	O	O	O	O	O	O	O

Q6. Please indicate how often do you use the following self-service technologies:

	I have never used	I use infrequently	I use occasionally	I use regularly
Websites	○	○	○	○
Online Shops	○	○	○	○
Self-Checkout Stations	○	○	○	○
Information Kiosks	○	○	○	○
Chat Bots	○	○	○	○
Automated Hotlines	○	○	○	○
Support Sites	○	○	○	○
Package Tracking Services	○	○	○	○
Click & Collect Stations	○	○	○	○
E-Commerce Marketplaces	○	○	○	○
Comparison Portals	○	○	○	○

Q7.

On a scale of 1 (very unimportant) to 7 (very important), please rate the importance of the following attributes with regards to self-service technologies:

	1 = very unimportant	2	3	4	5	6	7 = very important
Easy to use	○	○	○	○	○	○	○
Saves time	○	○	○	○	○	○	○
When I want	○	○	○	○	○	○	○
Where I want	○	○	○	○	○	○	○
Saves money	○	○	○	○	○	○	○
Easy to control	○	○	○	○	○	○	○
Enjoyable	○	○	○	○	○	○	○
Convenient	○	○	○	○	○	○	○
Low risk	○	○	○	○	○	○	○
Better than the alternative	○	○	○	○	○	○	○

Block 3: Technology Readiness

Q8. On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
Technology gives people more control over their daily lives	○	○	○	○	○	○	○
Products and services that use the newest technologies are much more convenient to use	○	○	○	○	○	○	○
You prefer to use the most advanced technology available	○	○	○	○	○	○	○

Q9. On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
Other people come to you for advice on new technologies	O	O	O	O	O	O	O
In general, you are among the first in your circle of friends to acquire new technology when it appears	O	O	O	O	O	O	O
You keep up with the latest technological developments in your areas of interest	O	O	O	O	O	O	O

Q10. On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
Technical services are not helpful because they don't explain things in terms you understand	O	O	O	O	O	O	O
There should be caution in replacing important people-tasks with technology because new technology can breakdown or get disconnected	O	O	O	O	O	O	O
Technology always seems to fail at the worst possible time	O	O	O	O	O	O	O

Q11. On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = strongly disagree	2	3	4	5	6	7 = strongly agree
You don't feel confident doing business with a place that can only be reached online	O	O	O	O	O	O	O
When you call a business, you prefer to talk to a person rather than to a machine	O	O	O	O	O	O	O
If you provide information to a machine or over the Internet, you can never be sure it really gets to the right place	O	O	O	O	O	O	O

Block 4: Amazon Go

Q12.
Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective App.

On a scale of 1 (very unlikely) to 7 (very likely) how likely would you use such a self-service store?

	1 = very unlikely	2	3	4	5	6	7 = very likely
Willingness to use such a self-service retail store	O	O	O	O	O	O	O

Q13. What are your expected benefits of using such a self-service store?

Q14. Are you familiar with Amazon Go?

Yes

No

Block 5: Demographics

Almost Done. You are almost done!

Before you finish, please answer the following demographic information.

Q15. Please select your gender

Male

Female

Other

Q16. Please indicate your age

Q17. What is your level of education?

- None
- Highschool Diploma
- Bachelors
- Masters
- Phd

Q18. What is your current occupation?

- Student
- Employed
- Unemployed
- Retired
- Other

Block 6: Thank You

Thank You. Thank you for your participation in this study! Your contribution is essential.

This research is conducted to understand the relationship between consumers' technology readiness, their satisfaction with SSTs and the resulting behavioral intentions toward retailers.

If you have any questions, suggestions or comments please use the space below.

To finish, please press the blue arrow button below.

→

Appendix II: SPSS Analysis Output

SST Experience Evaluation: Crosstabs

Crosstabulation

			Was this self-service technology encounter a satisfying or dissatisfying experience?		Total
			Satisfying	Dissatisfying	
Have you used a self-service technology in a retail context during the last three months?	Yes	Count	115	20	135
		% of Total	85,2%	14,8%	100,0%

SST Usage Rates: Frequencies

Frequency Table

	I have never used (%)	I use infrequently (%)	I use occasionally (%)	I use regularly (%)	Overall mean
Websites	1,3	9,4	16,3	57,5	3,54
Online Shops	0,6	7,5	24,4	51,9	3,51
Package Tracking Services	5	14,4	28,1	36,9	3,04
Self-Checkout Stations	2,5	21,9	24,4	35,6	2,91
Comparison Portals	4,4	18,8	25	36,3	2,82
E-Commerce Marketplaces	10	23,1	23,8	27,5	2,72
Support Sites	5,6	10,6	28,8	39,4	2,35
Automated Hotlines	1,9	19,4	22,5	40,6	2,01
Information Kiosks	5	13,1	27,5	38,8	1,95
Chat Bots	2,5	15	30	36,9	1,88
Click & Collect Stations	2,5	12,5	33,8	35,6	1,81

SST Key Benefits Evaluation: Principle Component Analysis

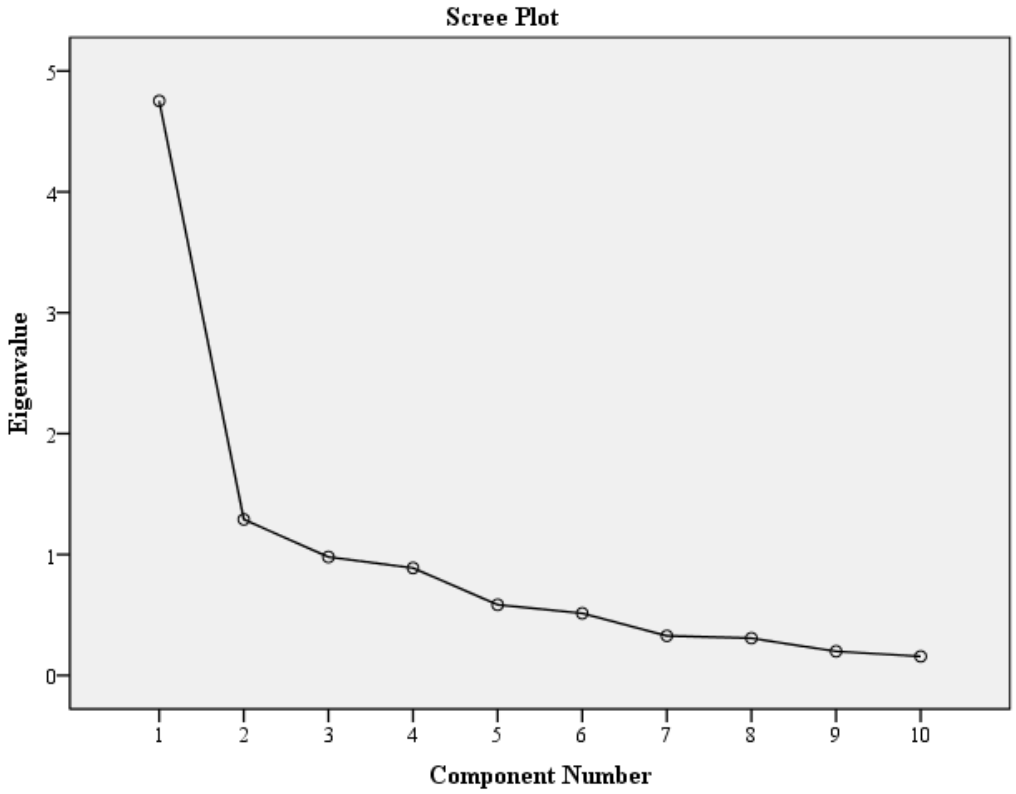
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,837
Bartlett's Test of Sphericity	Approx. Chi-Square	686,694
	df	45
	Sig.	,000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	4,753	47,526	47,526	4,753	47,526
2	1,290	12,904	60,430	1,290	12,904
3	,979	9,793	70,223	,979	9,793
4	,889	8,887	79,110		
5	,584	5,843	84,953		
6	,514	5,135	90,088		
7	,327	3,273	93,361		
8	,308	3,077	96,438		
9	,199	1,989	98,427		
10	,157	1,573	100,000		

Chart



Component Matrix

	Component		
	Component 1	Component 2	Component 3
Easy to use	,848	-,069	-,266
Saves time	,829	-,242	-,094
When I want	,743	-,492	,181
Where I want	,726	-,471	,238
Saves money	,478	,194	,748
Easy to control	,756	,304	-,087
Enjoyable	,366	,612	-,022
Convenient	,754	-,032	-,474
Low risk	,624	,368	-,020
Better than the alternative	,611	,350	,135

Gender-specific analysis of the willingness to use an innovative self-service store: Comparing Means

Report

	Willingness to use an innovative self-service retail store		
Please select your gender	Mean	N	% of Total N
Male	5,11	75	46,9%
Female	4,73	85	53,1%
Total	4,91	160	100,0%

The relation of familiarity with Amazon Go towards the willingness to use an innovative self-service retail store: Comparing Means

Report

	Willingness to use an innovative self-service retail store		
Are you familiar with Amazon Go?	Mean	N	% of Total N
Yes	5,76	70	43,8%
No	4,24	90	56,2%
Total	4,91	160	100,0%

Hypothesis 1: Linear Regression Analysis

Correlations

		SST_SAT	TR_Overall	Gender	Age	Education
Pearson Correlation	SST_SAT	1,000	,308	-,025	-,098	,087
	TR_Overall	,308	1,000	-,471	-,268	,360
	Gender	-,025	-,471	1,000	,132	-,285
	Age	-,098	-,268	,132	1,000	-,013
	Education	,087	,360	-,285	-,013	1,000
Sig. (1-tailed)	SST_SAT	.	,000	,386	,129	,157
	TR_Overall	,000	.	,000	,001	,000
	Gender	,386	,000	.	,064	,000
	Age	,129	,001	,064	.	,441
	Education	,157	,000	,000	,441	.
N	SST_SAT	135	135	135	135	135
	TR_Overall	135	135	135	135	135
	Gender	135	135	135	135	135
	Age	135	135	135	135	135
	Education	135	135	135	135	135

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Education, Age, Gender, TR_Overall	.	Enter

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,337	,113	,086	1,26655

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26,659	4	6,665	4,155	,003
	Residual	208,538	130	1,604		
	Total	235,197	134			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,769	1,015		1,743	,084	-,239	3,777					
	TR_ Overall	,510	,136	,377	3,755	,000	,241	,779	,308	,313	,310	,677	1,477
	Gender	,406	,251	,153	1,619	,108	-,090	,902	-,025	,141	,134	,763	1,311
	Age	-,002	,012	-,017	-,202	,840	-,026	,021	-,098	-,018	-,017	,920	1,087
	Education	-,009	,160	-,005	-,056	,955	-,326	,308	,087	-,005	-,005	,845	1,183

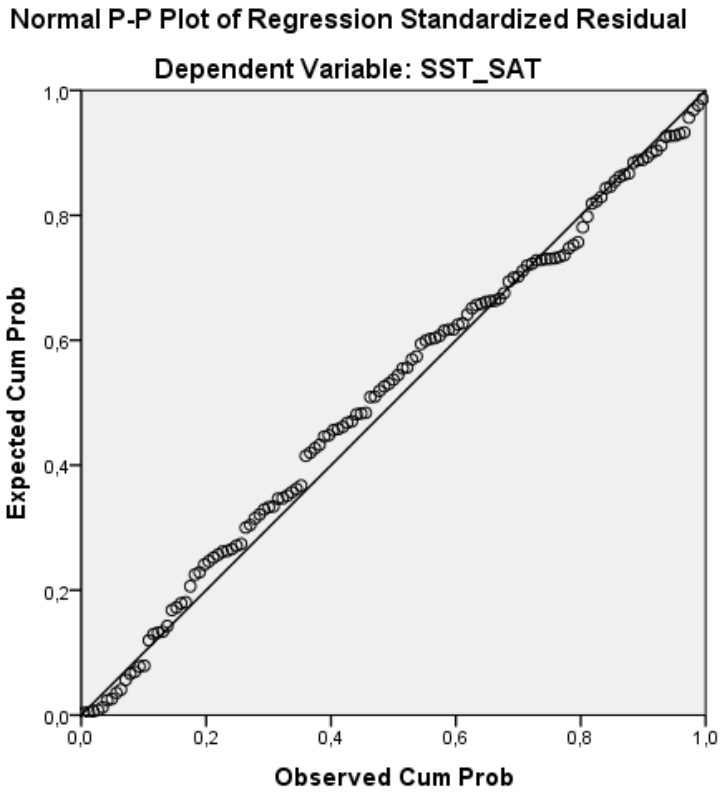
Collinearity Diagnostics

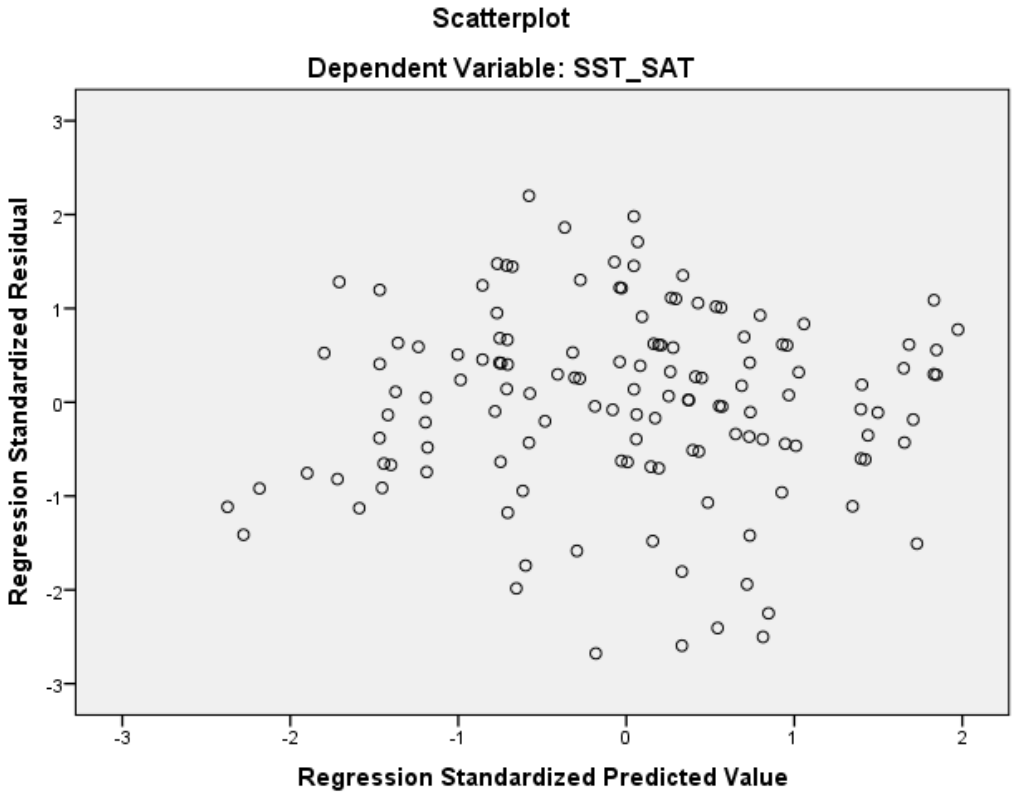
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	TR_ Overall	Gender	Age	Education
1	1	4,757	1,000	,00	,00	,00	,00	,00
	2	,126	6,142	,00	,08	,26	,07	,05
	3	,077	7,840	,00	,01	,27	,72	,00
	4	,030	12,496	,01	,38	,00	,03	,86
	5	,009	23,160	,99	,53	,47	,18	,09

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3,4128	5,3521	4,4716	,44603	135
Residual	-3,39075	2,78684	,00000	1,24750	135
Std. Predicted Value	-2,374	1,974	,000	1,000	135
Std. Residual	-2,677	2,200	,000	,985	135

Charts


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: SST_SAT
Expected Cum Prob
Observed Cum Prob
0,0
0,2
0,4
0,6
0,8
1,0


Scatterplot
Dependent Variable: SST_SAT
Regression Standardized Residual
Regression Standardized Predicted Value
-3
-2
-1
0
1
2
3

Hypothesis 2: Linear Regression Analysis

Correlations

		BI_Retailers	SST_SAT
Pearson Correlation	BI_Retailers	1,000	,469
	SST_SAT	,469	1,000
Sig. (1-tailed)	BI_Retailers	.	,000
	SST_SAT	,000	.
N	BI_Retailers	135	135
	SST_SAT	135	135

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	SST_SAT	.	Enter

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,469	,220	,214	1,20018

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54,125	1	54,125	37,575	,000
	Residual	191,579	133	1,440		
	Total	245,704	134			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2,448	,365		6,708	,000	1,726	3,169					
	SST_SAT	,480	,078	,469	6,130	,000	,325	,635	,469	,469	,469	1,000	1,000

Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	SST_SAT
1	1	1,959	1,000	,02	,02
	2	,041	6,920	,98	,98

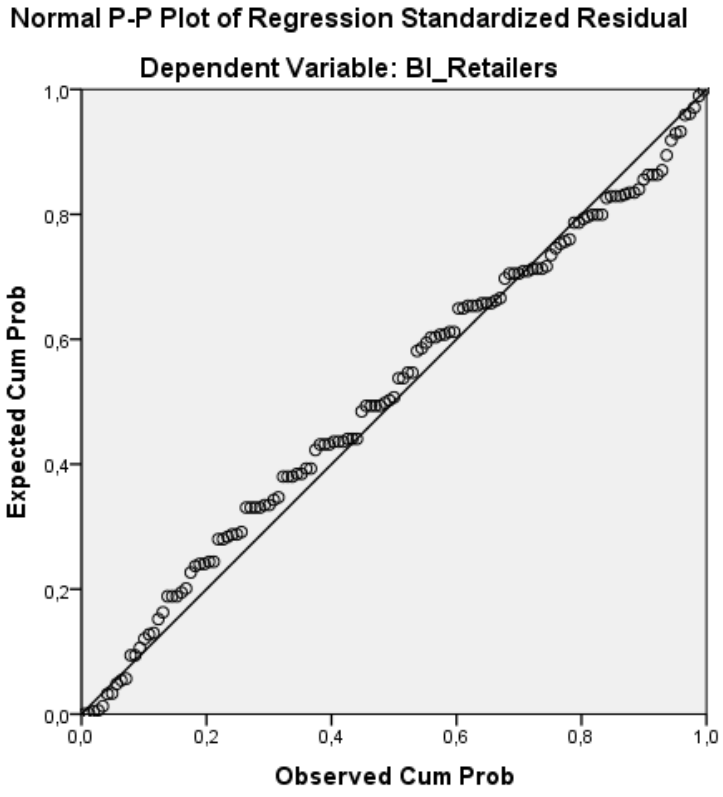
Casewise Diagnostics

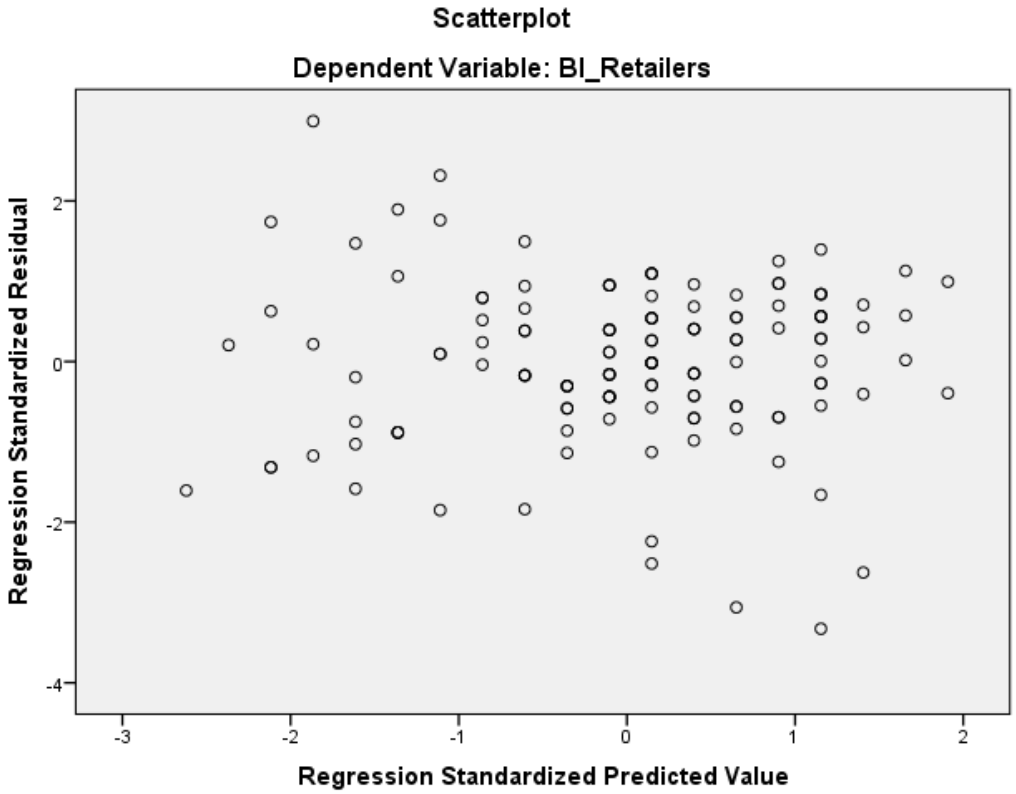
Case Number	Std. Residual	BI_Retailers	Predicted Value	Residual
32	-3,060	1,33	5,0060	-3,67264
44	-3,327	1,33	5,3258	-3,99245

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2,9272	5,8055	4,5926	,63554	135
Residual	-3,99245	3,59307	,00000	1,19570	135
Std. Predicted Value	-2,620	1,908	,000	1,000	135
Std. Residual	-3,327	2,994	,000	,996	135

Charts




Scatterplot
Dependent Variable: BI_Retailers
Regression Standardized Residual
Regression Standardized Predicted Value
2
0
-2
-4
-3
-2
-1
0
1
2

Hypothesis 3: Linear Regression Analysis

Correlations

		Willingness to use an innovative self-service retail store	TR_Overall
Pearson Correlation	Willingness to use an innovative self-service retail store	1,000	,476
	TR_Overall	,476	1,000
Sig. (1-tailed)	Willingness to use an innovative self-service retail store	.	,000
	TR_Overall	,000	.
N	Willingness to use an innovative self-service retail store	160	160
	TR_Overall	160	160

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	TR_Overall	.	Enter

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,476	,227	,222	1,538

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109,753	1	109,753	46,386	,000
	Residual	373,840	158	2,366		
	Total	483,594	159			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,365	,534		2,557	,011	,311	2,420					
	TR_Overall	,852	,125	,476	6,811	,000	,605	1,099	,476	,476	,476	1,000	1,000

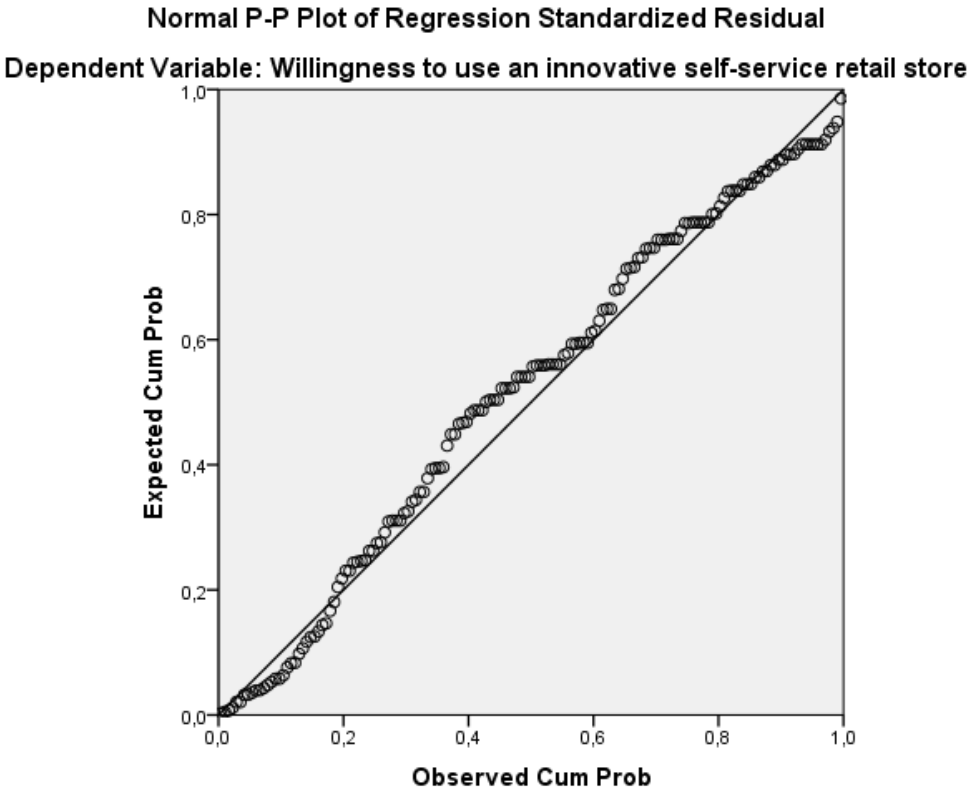
Collinearity Diagnostics

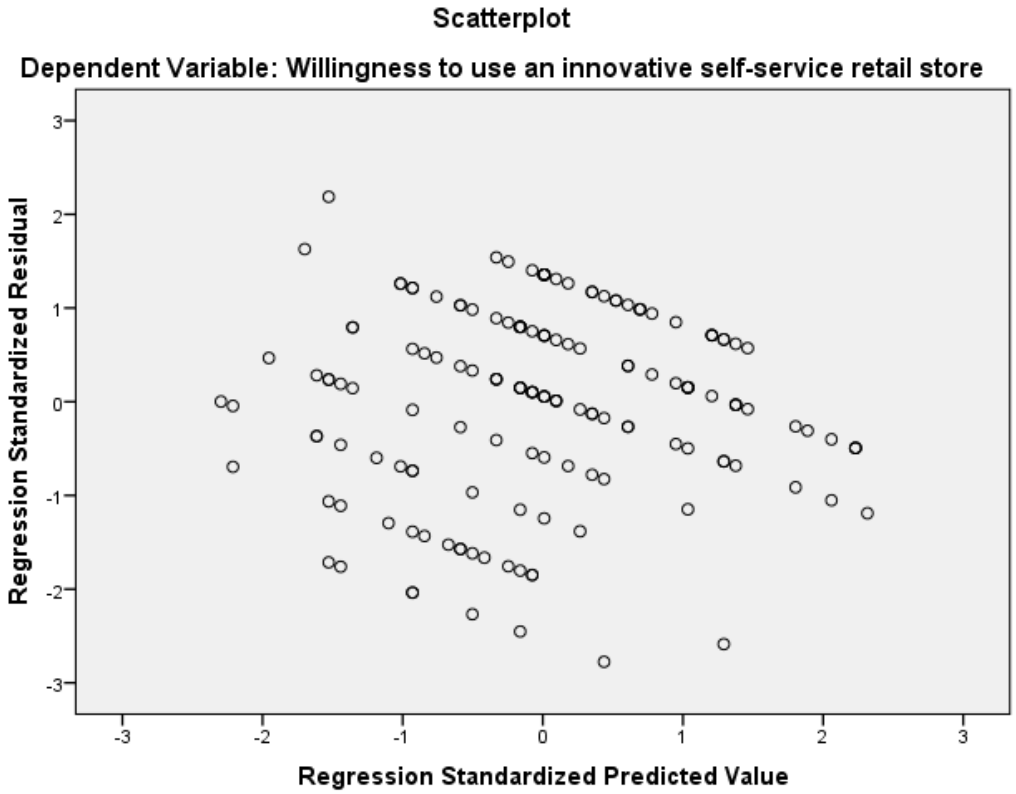
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	TR_Overall
1	1	1,974	1,000	,01	,01
	2	,026	8,666	,99	,99

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3,00	6,83	4,91	,831	160
Residual	-4,269	3,363	,000	1,533	160
Std. Predicted Value	-2,297	2,316	,000	1,000	160
Std. Residual	-2,775	2,187	,000	,997	160

Charts




Scatterplot
Dependent Variable: Willingness to use an innovative self-service retail store
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2
3

Appendix III: Impressions of Amazon Go